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Title:
Together Apart

A Study of Residential and School Mobility in England

Together Apart: A Study of Residential and School Mobility in England.

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A thesis submitted to the University of Bristol in accordance with the requirements for award of the degree of Doctor of Philosophy in the Faculty of Social Science and Law.

School of Geographical Sciences

December 2018

Word Count: 48,684

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Abstract

Mobility during childhood has been widely studied, with contributions focusing on residential mobility, on the one hand, and school mobility on the other. The evidence from both have identified the negative outcomes that can accrue from moving but despite both literatures being well developed little research has been carried out where a study of residential and school mobility is combined. Given the clear linkages between the place of residence and school attended, and therefore the clear dependency between moves in one impacting moves in the other this is especially surprising. Where these linkages have been made studies are largely cross-sectional, using single point in time measures. Longitudinal studies tend either to use small, unrepresentative data samples or large aggregate data that misses finer spatial detail.

This thesis builds on the current literature by using temporally rich data from the UK National Pupil Database (NPD) and longitudinal analyses to evaluate residential and school mobility based on ethnicity, socio-economic status and geography to examine the extent to which these are associated with educational attainment at age 16.

The first part of the thesis focuses on neighbourhood moves, analysing who is moving, the type and distance of move, whether there is a 'trade up' or 'trade down' in the neighbourhood hierarchy over the educational life course, and any change in ethnic composition between origin and destination neighbourhood to understand the type of move different groups are making.

The second part of the thesis examines school moves, which is then combined with earlier analyses on residential mobility to evaluate simultaneous home and school moves by ethnicity, socio-economic status and geography.

Finally, school and home moves, along with the type of moves and individual characteristics are modelled with a measure of secondary educational attainment as the outcome variable to assess how moving and type of moves are associated with educational attainment at age 16.

The results show that moving home has a negative impact on educational attainment compared to those that stay in the same location throughout the educational life cycle. Moving school two or more times also has a negative association with educational attainment at age 16. Those that 'trade up' in terms of quality of neighbourhood still do not achieve the same educational outcomes as their peers who live in a lower deprived neighbourhood throughout their schooling.

Declaration

I declare that the work in this thesis was carried out in accordance with the requirements of the University's Regulations and Code of Practice for Research Degree Programmes and that it has not been submitted for any other academic award. Except where indicated by specific reference in the text, the work is the candidate's own work. Work done in collaboration with, or with the assistance of, others, is indicated as such. Any views expressed in the dissertation are those of the author.

Signed:

Date:

Acknowledgements

First, I would like to thank my Supervisors, Professor Rich Harris and Professor David Manley. Particular thanks go to David for your patience and often needed reassurance. I never thought I would ever be able to complete a PhD, so thank you for your guidance throughout this process and helping me across the finish line.

To Tim Morris and Caroline Wright who have been a huge support throughout this process. Tim, thank you for showing me how to use stata! You have helped me to unpick complex models and work through ideas. You have been so generous with your time and explained things so well. I really could not have done this without you. Caroline, thank you for all the cups of tea and for being a sounding board throughout this process, you have helped me so many times to organise my thoughts and have been so encouraging. Thank you.

Thank you to Dr. Tony Hoare for kindly proof reading my thesis. You have a very good eye for incorrect grammar! Thank you for taking the time to read this and for showing a genuine interest in my research.

To my partner Chris, for putting up with me throughout this process and for helping me through my PhD wobbles. You have listened to me ramble on and have been so patient. Thank you for always believing in me and supporting me every step of the way. You definitely deserve the greatest portion of thanks for this thesis.

To the Browns community but most specifically Matthew Marshall, Alex Kwong, Jennifer Maddalena, Alexandra Holland, Miranda Nicholes and Moya MacDonald. Matthew, we have been in it together since day one and your friendship has been invaluable to me. Kwongy, Jen, Holls, Miranda and Moya you have made this PhD more enjoyable than I ever thought it would be, thanks for making all the bits in between great fun!

To my Mum and Dad for always encouraging me and instilling in me the never give up attitude that I have really needed throughout this PhD, and to all my Bristol friends, most specifically Jo Peacey for the coffee breaks and motivation along the way.

Finally, I am extremely grateful to the Economic and Social Research Council for providing funding for this PhD, and to the NPD for providing me the data which has been the basis for my thesis.

Executive Summary

Overview

The main aim of this thesis is to analyse the residential and school mobility patterns of a cohort of UK pupils over the compulsory educational life course, and in doing so to better understand how pupils move. The thesis explores these mobility patterns for multiple ethnicities and socioeconomic status across both time and space. The relationship between mobility and educational attainment is analysed to better understand what impact residential or school and residential and school mobility has on GCSE results at age 16, the final exams taken by all students when compulsory schooling ends. A benchmark of achieving five A*-Cs is set for certain employment and higher educational opportunities. These exam results are therefore a good marker of future life outcomes.

This thesis contributes to the current literature by using a longitudinal approach to studying mobility, rather than a cross-sectional or point in time study, and focuses on both residential and school moves simultaneously. When evaluating residential mobility, the type of move, in terms of distance, neighbourhood type and ethnic composition is also analysed. This thesis evaluates mobility for a cohort of NPD pupils living in England as a whole, but also utilises case studies to outline mobility patterns for certain ethnic groups, to better understand the reasons for these patterns through linking to current literature.

Key findings

- There are differences in the frequency of residential mobility among ethnic groups, most notably, Black African pupils move neighbourhoods the most often.
- There are differences in the frequency of school mobility among ethnic groups, with Black Caribbean pupils moving school the most often.
- On average, those who move within the same types of neighbourhood have lower GCSE grades than those who live in the same neighbourhood throughout the educational life course and do not move.
- It is not just about being 'stuck in place' (living in the same deprived neighbourhood throughout the educational life course) but also 'stuck in *type* of place' (moving between deprived neighbourhoods throughout the educational life course) as less than 1% of pupils upgrade or downgrade their neighbourhood from the most deprived to least deprived or vice versa. Pupils who move are most likely to move to a neighbourhood with a similar level of deprivation to their origin neighbourhood.

- With every additional neighbourhood move predicted GCSE grades will be lower, meaning the more a pupil moves the more their educational attainment will be negatively affected.
- Moving school two or more times has a greater negative impact on educational attainment than moving home the same number of times.
- Pupils living in London are less likely to be allocated their first choice of Secondary school and are more likely to move school without classmates.

Policy Recommendations

- Moving neighbourhood has a negative association with educational attainment. This raises implications for two areas of housing policy; the bedroom tax and the current temporary housing structure. The bedroom tax penalises a family with an unoccupied bedroom, meaning if one child has left home, but other children remain, they may have to move house to avoid receiving less housing benefit due to an unoccupied bedroom. Children who are homeless or at risk of being homeless are often provided with housing that is only temporary and will often require several moves before a permanent home is found.
- Lack of affordable housing, especially in inner-city areas means that for many families privately renting accommodation is their only option. Private rented accommodation can be substandard and be a health and safety risk meaning families have little choice but move causing a higher frequency of residential mobility.
- There is a need to focus not just on those who are most deprived and 'stuck in place' but children and young people who are hyper-mobile and moving between the most deprived neighbourhoods as these pupils score the lowest points on average at GCSE compared to all other pupils.
- The UK Government has introduced a secondary school allocation system centred on "choice" but there are urban/rural disparities. Pupils living in inner-city areas such as London, often in the most deprived neighbourhoods, rarely get their first choice of secondary school and therefore are more likely to move school without classmates which has been found to cause disruption and added anxiety. Whereas in rural areas there is often only one or two secondary schools in the local area to choose from, so pupils are guaranteed one of their top three choices.

Conclusion

The findings in this thesis are particularly important in relation to current Government, housing and school choice policies. It is clear from the analyses that being 'stuck in *type* of place' has more of a negative association with educational attainment than being 'stuck in place'. Policies, therefore, need to specifically consider pupils who are highly mobile in deprived areas as it is these pupils that have the lowest attainment at GCSE. The bedroom tax and temporary housing policies need to be reviewed so that moving home frequently can be avoided if possible, as the more a child moves home, the lower their GCSE scores are. All privately rented housing should be at an adequate standard, so that families are not forced to move due to an unsafe living environment. Finally, in terms of school choice, the currently policy only seems to favour families in areas where there is lower demand for secondary school places, such as in more rural areas, and families who have the financial means to move to catchment areas to guarantee a place in their chosen secondary school.

Chapter 1: Introduction

1.1 Context

Residential mobility, the relocation of a household from one location to another, is a widely studied phenomenon across a broad range of disciplines including health, education and economics. Research has been conducted on the factors that influence residential mobility and the way that residential mobility then influences further outcomes (Leckie, 2009; Jelleyman and Spencer 2008; Pribesh and Downey, 1999). Residential mobility is a common occurrence; census data shows that around one in ten people in the UK move home every year (Champion, 2005). This figure varies over space and over time but is generally found to be higher amongst younger families with children than for other demographic groups (Champion, 2005).

Where people live and where they move throughout their life time are important factors for understanding a wide range of outcomes. There is a strongly held belief that the circumstances a child is born into shapes their life course (SMCP, 2015; Glass and Bilal, 2016). The key concern is that those born into poor families are likely to remain poor as they transition into adulthood (SMCP, 2015; van Ham et al., 2014). Research also suggests that the duration, depth and the age of exposure to poverty are decisive in later life (Chetty et al, 2015; Hedman et al., 2013). The younger children are when initially exposed, the longer they can potentially live in poverty (Sharkey and Elwert, 2011; Samson, 2008; Brooks-Gunn & Duncan 1997). Similarly, the more extreme the poverty is, the more severe the potential effects in adulthood (Brooks-Gunn & Duncan 1997). Van Ham et al (2014) highlight evidence of the negative effects of living in deprived neighbourhoods on a diverse range of outcomes, including social mobility, moves in to and out of work, and educational attainment. The residential mobility literature has focused more on the reasons *why* people move (Rossi 1955, Clark and Onaka, 1983; Gasper et al, 2010) and the impact a move has on an individual (Coulton et al 2012; Cordes et al, 2015). There has been less of a focus on the *type* of move made, for example how far the person has moved or to the type of neighbourhood they have moved from or to.

Alongside the residential mobility literature, school mobility has also been widely researched, often linked to education, health and behavioural skills (Herbers et al, 2013; South et al, 2007; Machin et al, 2006). The number of non-compulsory school moves –the school moves made at non-transitionary points across the educational life course (e.g. from primary to secondary school) - are lower than those of residential moves with around 1 in every 20-moving school within the UK each year (Machin et al, 2006), often because short distance residential moves do not involve the need to also move school. Intriguingly, school mobility is often studied independently of residential mobility, with residential

mobility literature mainly focusing on the drivers of moving home (Clark and Dieleman, 1996) whereas school mobility tends to fall into wider educational research. However, the two are clearly linked, most obviously when moving home necessitates a change in school.

School and home are the two key spaces that children occupy for much of their childhood, and even when they are not in these spaces physically their interactions with others and their access to activities is largely governed by the home and school. It is therefore essential that both are considered when researching mobility and how moves between school and neighbourhoods also impact on young people and their educational outcomes over time. More recently, there has been some combined research on both home and school moves (Cordes et al, 2015; Hutchings et al 2013; Leckie 2009). However, many studies fail to use longitudinal data, comparing childhood with adulthood using only cross-sectional data (and therefore not the same people). Others do use longitudinal data with but often only using a small sample of individuals or aggregate data that lack the geographical detail that should underpin spatial analysis. (Cordes et al, 2015; Chetty et al, 2015; Leckie, 2009).

1.2 Aims

In response to the current gap in the literature, the aim of this thesis is to focus on both residential and school mobility, using data from the UK National Pupil Database (NPD) to analyse neighbourhood and school moves each year across the educational life course. The NPD is owned and maintained by the Department for Education (DfE) and holds and collects a wide range of information about all students who attend state schools in England. It is the most complete record of academic attainment in the UK. Using NPD data, it is possible to track neighbourhood and school moves over the eleven-year educational life course for a cohort of pupils who all started school in 2002 and remained in compulsory schooling until age 16 (2013). The NPD provides individual level data such as ethnic group, language and eligibility for free school meals so there will be contextual information available for all pupils to help strengthen understanding of mobility and educational outcomes.

This thesis will analyse the origin and destination neighbourhoods of all those who move during the educational life course to assess a change in neighbourhood type, as well as how individual and socio-economic status impacts upon educational attainment to determine if there are differences amongst social and ethnic groups. In doing so, the work will contribute to the debate in relation to mobility studies on type of move, and whether the household a pupil lives in are 'upgrading' or 'downgrading' in terms of the quality of their neighbourhoods and what difference this makes in terms of educational outcomes.

The overall aim of this thesis is to provide a better understanding of how neighbourhood and school moves are associated with educational attainment - not only the move itself but also the type of move and how this is different for ethnic and social groups across time and space.

1.3 Research Questions

To achieve the stated aims, four research question are presented:

1) How are socio-economic status, ethnicity and geography associated with residential mobility?

A series of analyses are undertaken examining whether certain ethnic and social groups (using Free School Meal (FSM) eligibility as an indicator of socio-economic status) have more of a propensity to move home than others and to analyse the geographical pattern of residential mobility. A case study is included on Bangladeshi pupils living in Tower Hamlets to better understand residential mobility patterns.

2) How are socio-economic status, ethnicity and geography associated with type of neighbourhood move and distance moved?

A series of analyses using the Index of Multiple Deprivation (IMD) to assess whether certain types of neighbourhoods are most strongly associated with residential mobility and if pupils are able to 'trade up' in terms of neighbourhood quality. The distances moved by each ethnic and social group are calculated to not only to understand who is moving but also the type of move taking place. This chapter includes a case study of London which looks at the ethnic composition of origin and destination of neighbourhoods to see how certain ethnic and social groups are moving and how residential mobility in London compares to England as a whole.

3) How are socio-economic status, ethnicity and geography associated with school mobility and does this have any association with pupils who move home and school simultaneously?

A series of analyses are used to examine whether certain ethnic and social groups have a greater propensity to move school than others and to analyse if there is a geographical pattern of school mobility. Home and school moves are compared simultaneously to see whether certain ethnic and social groups are more likely to move both school and home and if there are any differences geographically.

4) Is residential and/or school mobility adversely associated with educational attainment?

The association of residential and school mobility with educational attainment at secondary school is examined, using GCSE results and the odds of achieving five A*-C as grades. Also examined is whether

'upgrading' or 'downgrading' neighbourhoods has any association with GCSE results and if there are any differences geographically and among ethnic and social groups.

1.4 Structure of Thesis

Chapter 2 presents a review of the literature on residential and school mobility by summarising the work that has previously been researched in this area. Considering literature relating to both residential mobility and school mobility, the reasons for moving and the impact this has on pupils. The review also considers how mobility impacts on ethnic and social groups. The chapter concludes with a summary of the main findings and outlines some of the gaps within the current literature.

Chapter 3 introduces the data source and overarching modelling strategy used for the empirical analyses in this thesis. Data come from the National Pupil Database (NPD), a national educational cohort study of just under 500,000 pupils who all started school in 2002. It presents a uniquely detailed dataset to evaluate moves by ethnicity, socio-economic status and geography as well as the educational impacts of residential and school mobility. This chapter provides a summary of the data, a rationale for using specific variables and the strength and weaknesses of the data. The multilevel model is explored in detail in this chapter as it forms the analytical framework for the analytical chapters in this thesis.

Chapter 4 evaluates neighbourhood moves by ethnicity, FSM eligibility and geography to get a better understanding of whether certain social and ethnic groups have more of a propensity to move than others and if this varies across time and space. A case study is included to take analysis one step further to analyse where pupils move and patterns of residential mobility.

Chapter 5 builds on the findings in chapter 4 by extending the analysis to include type of move. The Index of Multiple Deprivation (IMD) is used to compare origin and destination neighbourhoods. Distance moved is also calculated to analyse differences among ethnic and social groups. A case study of London is included to analyse how ethnic composition changes and to assess the difference in propensity to move by London Borough.

Chapter 6 evaluates school moves by ethnicity, FSM eligibility and geography to get a better understanding of whether certain social and ethnic groups have more of a propensity to move than others and if this varies across time and space. A case study of Black Caribbean pupils living in Lambeth is included to take analysis one step further to analyse school moves specifically between primary and secondary school. Finally, those who move home and school simultaneously are evaluated by their

ethnicity, socio-economic status and where they live to analyse if certain groups have more of a propensity to move both home and school than others.

Chapter 7 examines the associations between residential and school mobility and educational attainment at age 16. The analyses focus on school and home moves but also analyses how neighbourhood type, distance moved, and individual characteristics are associated with educational attainment.

Chapter 8 presents a summary of the research findings found in chapters 4–7 and discusses the policy and research implications of these findings for future research. Additionally, limitations of this thesis will be outlined along with ideas for future research in this area of study.

1.5 Publications arising from this thesis

Sweet, A., Harris, R. & Manley, D. 'Better to stay or go? A longitudinal study of mobility over the educational life course' (2018) Applied Spatial Analysis and Policy, DOI 10.1007/s12061-018-9263-9.

This paper reports on some of the key findings from chapter 4, 5 and 7.

Chapter 2: Literature Review

2.1 Introduction

Since 2008, partially due to the recent global economic crisis, the debate around social mobility and equality of opportunity has been reignited. In 2010, The Social Mobility and Child Poverty Commission was formed to monitor progress the government was making in improving social mobility outcomes for children and young people in the UK (SMCP, 2014). Traditionally, within academic and political spheres, residential mobility has largely been discussed in terms of socio-economic outcomes, with a lack of focus on the spatial element of mobility. Sharkey (2012) argues that it is essential to know what type of resources, risks and role models are present in a child's neighbourhood at various points in her or his development. It is during childhood and adolescence that individuals are more susceptible to the consequences of social and environmental change (Morris et al., 2016), yet there is a lack of detailed longitudinal research on the residential and school mobility of children and young people.

Where people live and where they move over the life course is an important factor in understanding life outcomes. This links with the residential mobility literature which looks at the reasons why people move and the impact this has on individuals and with the neighbourhood effects literature which states that where you live determines your life chances above and beyond individual characteristics (van Ham and Manley, 2012). Most studies, however, evaluate the associations between neighbourhood environments on individual life outcomes using point-in-time measures. The temporal dimension of mobility is often overlooked, or where included, only studied over a short period of time. For example, a child may have moved several times over their educational life course, but this would not be picked up without a longitudinal design. Spatial mobility is integral to better understanding life outcomes over and above point in time analysis and social measures such as income or class.

Very little research has focused on both neighbourhood and school simultaneously as drivers of mobility. Studies that have focused on both have tended to use large aggregate data sets which lose important spatial detail necessary for a full understanding of individual outcomes (Cordes et al., 2015; Chetty et al; 2015). School and home are the two key spaces that children occupy, and it is therefore important that both are studied when researching mobility and how moves between school and neighbourhoods impact on young people and their educational outcomes (van Ham & Manley, 2012; Sharkey 2012).

Firstly, in this chapter the factors that contribute to residential mobility are outlined, identifying the reasons why people move home and how this can impact children and young people. Secondly, residential mobility related specifically to lower socio-economic and ethnic minority groups is

examined, highlighting that there are different types of residential moves depending on individual characteristics. The factors that contribute to non-compulsory school moves are then outlined, focusing on how school moves can impact on children and young people. Finally, previous studies of residential and school mobility are reviewed highlighting some of the main gaps within the current mobility research.

2.2 Residential Mobility

The neighbourhood effects literature states that where you live determines your life chances above and beyond individual characteristics (Wilson 1987; Galster, 2002; van Ham and Manley, 2012). Where people live and where they move over the life course is an important factor in understanding life outcomes. The long history of residential mobility research starting with the work of Park, Burgess and the Chicago School is based on the notion that people move to improve their socio-spatial status and physical surroundings (Clark et al., 2014). This perspective emphasises that people move during the life course to bring their employment opportunities and housing needs into balance and to attain higher levels of satisfaction and achievement (Clark and Dieleman, 1996).

In the early 1950s, Peter Rossi carried out a ground-breaking seminal study in Philadelphia which found that changing housing needs at different points across the life cycle caused families to move (Gasper et al., 2009; Rossi, 1955). This research found that people move as part of an upward economic shift, to better homes and neighbourhoods. Rossi's seminal study on residential mobility took place while there was marked economic growth and prosperity in the United States. Rising incomes meant families could afford to buy homes in the areas they wanted for the first time.

These ideas have been developed over the last 60 years and addressed by several authors (Bird, 1976; Clark and Onaka, 1983; Lee et al., 1994). Gasper et al. (2010) state that residential mobility is part of a status attainment strategy, with parents moving to neighbourhoods with better schools and homes to enhance the life chances of their children. The homes and neighbourhoods in which people live, therefore, reflect their socio-economic position in society (Clark et al., 2014; Cheshire 2011). The ability to move out of deprived neighbourhoods is integral to achieving the social improvements and access to opportunities provided by more advantaged areas (Clark et al., 2014).

Certain life events and individual characteristics can trigger home moves. These events include timings of childbirth (Kulu, 2005); marriage and divorce for example (Feijten and van Ham, 2010). In terms of characteristics, a change in socio-economic position or employment which results in a change in income can make it possible for an individual to move to a better neighbourhood or larger house. A neighbourhood that satisfied the neighbourhood and housing preferences of a couple may change

once they plan to start a family. The characteristics of an area such as low school quality or some instances of crime in the area, which were not considered problematic previously, can change once children are born (Boschman et al., 2016; Clark et al., 2014). According to the residential attainment perspective, moving is typically associated with residential satisfaction and upward mobility (Desmond, 2015). Duncan and Newman (2007) state that moves are, for the most part, deliberate, rational and planned. As well as moving for life course events, individuals or families may decide to move due to dissatisfaction with their current home or neighbourhood (Rabe and Taylor, 2010; van Ham and Feijten, 2008). A change in the quality of the local environment, increasing crime rates or decline in adequacy of services may cause a family to leave a neighbourhood (van ham et al., 2013; Clark and Huang 2003).

Traditionally, studies of residential mobility have examined short distance moves within the same labour market (Clark and Huang, 2003) whereas long-distance moves (a move of 50km (31 miles) or more) are associated with distant labour market employment opportunities (Clark and Huang, 2003). Clark (1982) set out an extensive literature review outlining the distinctions between internal migration and mobility studies. However, studies have developed with the focus not just on who moves, when they move and how far, but reasons and triggers for moves and the effects these have on the individual or family. For example, Clark and Dieleman (1996) studied the household life cycle, noting that moves were caused by different life events and individual and family needs, as well as economic and political influences. More recently residential mobility has been linked to a range of different socio-economic, educational and health-based outcomes, with the focus being not on why people move but how moving can have a positive or negative impact on outcomes over and above individual characteristics.

Although residential mobility can be due to status attainment and improvements in socioeconomic status, lower-income families may move due to unstable housing conditions. These moves may have negative consequences (Coulton et al., 2012; South et al., 2005). Lower-income households may make frequent moves because of economic or social issues. Many moves undertaken by low-income families can be involuntary, especially when moves are forced, for example, when a family are evicted by a private landlord (Desmond, 2015; Coulton et al., 2012). This is a different perspective on residential mobility, which is also known as the residential instability model (Desmond, 2015). Being mobile therefore should not be assumed to be deliberate, planned or positive. Rather, some families may experience moving as a negative outcome that can be very distressing for an individual or family who does not want to leave their home or neighbourhood (Coulton et al., 2012; Desmond 2015).

2.3 Residential mobility: Impact of moving

Moving frequently, even over short distances can be extremely disruptive for children as they are more reliant on closer social and geographical peer networks than adults and therefore may be more likely to negatively experience a residential move (Sharkey, 2012; Cordes et al., 2016; Morris et al., 2016). Bushin (2009) argues that children are often involved in the migration decision-making process by helping to determine whether a family moves and where they move to. However, when moves take place due to economic or social problems children can be conceptualised as 'passengers' in relation to the moving process as they rarely explicitly drive such a residential move (Pribesh and Downey, 1999). The State of the Nation report 2016 (SMCP, 2016) states that both residential and educational stability is very important for children. Because of this, they are advising the government that social housing tenancies need to be implemented so that the same accommodation is available until the youngest child leaves home. This, however, conflicts with the Bedroom Tax policy which decreases the amount of housing benefit paid to a claimant judged to have more bedrooms then necessary. In effect penalising families for staying in a home once other children have left.

Residential mobility can be disruptive for all children but is often more detrimental for those from lower income families, especially when moving home comes about because of a negative consequence, through socio-economic hardship (Coulton et al., 2012). Moves that are unplanned or sudden that are the result of family disruption, such as divorce, eviction or death carry the most serious risk of psychological and emotional harm (Crowley, 2003). Moves that carers or parents experience as troubling or concerning are more likely to negatively impact their child as they can visibly see how the move is causing distress to their family (Crowley, 2003; Scanlon & Devine, 2001).

There is a wealth of literature exploring how educational attainment is related to the type of neighbourhood a pupil lives in; it is consistently found that those living in the most deprived neighbourhoods have lower educational attainment than those living in more affluent neighbourhoods (Nieuwenhuis, 2016; Pribesh and Downey, 1999). Pribesh and Downey (1999) found that individual characteristics and family situation accounted for nearly all of the differences in exam results between mobile and non-mobile pupils. It was concluded that those who move achieve lower educational outcomes at school than those who do not because highly mobile families are also more likely to experience other disadvantages (Gasper et al., 2010). For example, teenagers who moved to more deprived neighbourhoods were more likely to drop out of school than those who had lived in the same deprived neighbourhood throughout their schooling (Coulton et al. 2009; Crowder and South, 2003) However, teenagers who moved from some of the most deprived neighbourhoods to more affluent neighbourhoods, were more likely to settle in their new environment (Coulton et al,

2009; Pettit, 2004). This highlights that it is not only moving that matters, but also where pupils move from and to that has an influence on educational attainment.

The Moving to Opportunity (MTO) study was an experiment devised by the US Housing Department in 1992, which offered at random families living in the most deprived neighbourhoods housing vouchers to move to less deprived neighbourhoods (Chetty et al., 2016). This study has enabled policy makers and academics to analyse data, to evaluate the effectiveness of being able to move to a better neighbourhood during childhood. Chetty and Hendren (2015) found that the earlier a family moves to a more affluent neighbourhood, the better the future earnings will be for their children. Chetty and Hendren (2015) also find that there are some differences in predicted educational outcomes by gender across neighbourhoods. In highly segregated neighbourhoods, for example, boys tend to have lower educational attainment than girls.

Chetty et al., (2016) found that children who moved to a better neighbourhood at or before age 9 had significantly better economic outcomes than those who grew up in the most deprived neighbourhoods (Glass and Bilal, 2016). Chetty et al. also found that those who moved as young children to less deprived neighbourhoods had higher earnings as adults. This effect declined by age, with no effect among those who were teenagers at the time of moving. This suggests that the timing of and duration of living in a deprived neighbourhood is related to later life outcomes, especially socio-economic status as an adult (Samson, 2008). However, it is important to note that neighbourhoods in both the Chetty & Hendren (2015) and Chetty et al. (2016) studies are the same population size as most large cities in the UK. Therefore, spatial analysis is weak.

Clark and Morrison (2012) studied a set of neighbourhoods in New Zealand, based on 30,000 individuals on a statistically representative set of urban and rural areas across the country. They found after controlling for the individual characteristics of movers, a lower the degree of upward mobility is experienced by movers the more deprived the neighbourhood of origin is (Clark et al., 2011). However, this study only focuses on moves between 2005 and 2007, so it is missing the important longitudinal aspect of the study.

Van Ham et al. (2013) use individual-level data to track the whole population of Stockholm from 1990 to 2008, by tracking the ordering of neighbourhood income over each of the person-years provided so individual neighbourhood histories could be combined and viewed. Young people are tracked after leaving the parental home for nearly two decades. Van Ham et al. (2013) state that the type of neighbourhood lived in after leaving the parental home is strongly associated with the socioeconomic composition of the neighbourhood lived in as children. Sharkey (2012) argues that it is essential to know what type of resources, risks and role models are present in a child's neighbourhood at various

points in his/her development. It is essential to know how enmeshed the individual is in the social networks and the public life of the community and to know the types of residential environments that the individual and his/her family members have occupied over lifetimes and generations. Van Ham and Manley (2012) argue that living in a deprived neighbourhood your whole life will have more severe negative effects than exposure to a deprived neighbourhood for only a short period of time. This contradicts the findings of Crowder and South (2003) who found that teenagers moving into deprived neighbourhoods had a higher risk of dropout than those who had lived in a deprived neighbourhood their whole life. Wodtke et al. (2011) and Sharkey and Elwert (2011) find that there is a negative effect on cognitive ability for those living in a deprived neighbourhood.

While there has been a focus on neighbourhood effects when researching residential mobility, there has been much less research on the process of movement between neighbourhoods (Clark et al., 2011). The studies that have focused on residential mobility examine the ability of people to move out of deprived neighbourhoods rather than the change in neighbourhood type (Clark et al., 2011; South and Crowder, 2005; Quillian, 2003). The studies that have analysed movement across neighbourhood type tend to focus more on movement across different ethnic contexts rather than changes in socio-economic status (Clark et al., 2011; Bolt and van Kempen, 2008). Sharkey (2012) emphasises the importance of not focusing on one specific point in time but to better understand an individual through long term analysis, in the context of neighbourhoods and to move away from point-in-time measures to better understand individual neighbourhood histories. Even though there is an extensive literature on neighbourhood effects, the temporal dimension is often overlooked (Van Ham et al., 2013; Sharkey 2012; Quillian, 2003;). Understanding the impact residential mobility has on a child's later life outcomes can only be properly understood if the context in which they lived is known throughout childhood, which will be a key focus of this thesis.

2.4 Residential mobility: Neighbourhoods and Deprivation

The neighbourhood effects literature has influenced the residential mobility debate by bringing in an important spatial element to research. Understanding the neighbourhood in which a child has grown up in and their exposure to a certain type of neighbourhood over time allows for a better understanding of life course outcomes. Identifying who is moving and how often they are moving is important in understanding and predicting future life outcomes. There is evidence that moving to a more deprived neighbourhood leads to poorer educational outcomes (Sharkey and Elwert, 2011; Crowder and South, 2003) and poorer health outcomes (Tunstall *et al.*, 2012, Norman et al., 2005). It is therefore not only important to study who is moving, but also where they are moving from and to.

Some children, for example, may live in an affluent neighbourhood for much of their childhood and only move to a deprived neighbourhood during their final years of school. Thus, their level of exposure to a deprived neighbourhood would be very different to a child that only moves between deprived neighbourhoods, and the effects of those moves on their educational outcomes could also differ as a consequence.

Deprivation indices are used in policy and research applications to identify and target neighbourhoods to address a range of inequalities (Norman, 2016). The UK Census does not include an income question; deprivation indices are therefore proxies for income and other aspects of deprivation (Norman, 2016). There are many different deprivation indices used in the UK such as Index of Multiple Deprivation (IMD), Townsend Index and Carstairs. Policy research and academic studies use deprivation scores to explain differences across a range of population outcomes and to identify areas in need of additional funding or intervention (Norman, 2010). However, Norman (2010) argues that it can be difficult to compare neighbourhood change over time because indices are generally cross-sectional point in time measures. When studying residential mobility, it is important to include a measure of deprivation to compare the origin and destination neighbourhood to understand where an individual is moving from and to.

2.5 Residential mobility: Ethnic and Social Groups

The neighbourhood effects literature also highlights the importance of location in terms of socio-economic outcomes. For certain social classes and ethnic minority groups, there are more barriers present to inhibit residential mobility. The residential mobility options for those living in deprived neighbourhoods are much more restricted compared to those living in more affluent areas, with less economic ability to move to more desirable areas. Residential mobility, especially among individuals or families with lower socioeconomic status generally involves short distances and relocation to neighbourhoods that are similar to their former neighbourhood in terms of level of deprivation (Cooke, 2010).

Families with low income often experience a range of disadvantages. Unstable housing, such as difficulty paying rent or mortgage can lead to evictions or the need to downsize, denied housing resulting from discriminatory practices or criminal background could also limit the availability of housing stock available (Clark et al., 2010). In the US Between 2005 and 2010, fifty per cent of all households below the poverty line moved home at least once (Ihrke and Faber 2012). Children living in such households are almost fifty per cent more likely to experience residential instability compared to their wealthier counterparts, moving on average more than six times before adulthood (Desmond

et al., 2015). In the UK a survey found that previously housed children moving into temporary accommodation had missed over fifty days at school due to the disruption of changing residences (Shelter, 2004).

In the UK, Clarke et al. (2017) identified the main reasons for evictions and forced moves are changes in welfare benefits, unaffordable rents, rent arrears, lack of affordable housing, the poor condition of the property, or the behaviour of landlords. In many cases landlords have no option but to evict tenants if they are missing rent payments, however forced moves also come about if an individual or family feel they have no other choice but to leave a property due to substandard living conditions such as damp, or due to the poor behaviour of a landlord (Citizens Advice, 2015) Furthermore, those with lower economic status are more vulnerable to these issues due to limited monthly spend for housing and lack of savings (Clarke et al., 2017).

Forced mobility due to eviction or difficulty in paying rent in the US has been linked to downward moves in terms of neighbourhood quality (DeLuca et al. 2013). Residential moves to find cheaper housing are often made within the same type of neighbourhood (Crowley, 2003). A recent study found that renters who were evicted or forced to move relocated to more deprived neighbourhoods with higher crime rates than the origin neighbourhoods from which they moved from (Desmond and Shollenberger, 2013). Forced moves have also been linked to poverty and homelessness (Hartman and Robinson 2003).

Some of the racial or ethnic differences in residential mobility patterns are due to socioeconomic status (Boschman et al., 2016). In the Netherlands, due to their lower income, ethnic minorities often move to areas with cheaper housing or neighbourhoods with an increased stock of social and rented accommodation (Boschman et al., 2016; Boschman and Van Ham 2015). Glass and Bilal (2016) argue that the stickiness of residence is a consequence of socioeconomics, policy and institutional racism and therefore not just solely down to choice. This reinforces the idea that people become 'stuck in place' (Sharkey, 2012). However, this would imply that people do not move, when in fact people are moving but within a certain type of neighbourhood and are, therefore 'stuck in *type* of place'. Chetty and colleagues state that people are more likely to have improved life outcomes and the ability to move from the bottom to the top if they have family stability and live in less segregated neighbourhoods with better schools and good social capital (Chetty et al., 2014).

When differences in socio-economic status are taken into consideration, the majority population are more likely to move to affluent neighbourhoods than the ethnic minority population (Boschman et al., 2016). Studies in the United States reveal that neighbourhoods with concentrated poverty and deprivation are often non-White (South et al., 2011; Galster et al., 1999; Massey & Denton 1988).

South et al. (2011) find that Black individuals are much less able than White individuals to move from deprived to non-deprived neighbourhoods. Moreover, even when Black individuals are able to attain residence in more affluent neighbourhoods, they are much less likely than White individuals to remain there. Coulton et al. (2012) state that African-American households in the United States had a lower probability of moving than White households. This suggests that many African-American households may remain in unsatisfactory housing or neighbourhoods due to social and economic barriers to mobility. In the UK a similar pattern exists. Phillips (1988) found that ethnic minority groups tended to be allocated poorer quality social housing on deprived estates in London, compared to the White British population. This was sometimes due to Local Authorities deliberately concentrating ethnic minorities in specific areas of a town or city, or due to direct discrimination (Butler and Hamnett, 2011; Phillips, 1988).

The residential mobility process for ethnic minority groups can be divided into three models; the spatial assimilation model, the place stratification model, and the ethnic enclave model (Bolt and van Kempen, 2010). The spatial assimilation model is centred around individual choice of where a member of an ethnic minority group wants to live. Choosing to move house and deciding where to live is down to preference as well as individual resources and possible restrictions (Bolt and van Kempen, 2010). Phillips et al. (2007) argue that ethnic minorities may be limited in their housing choices due to a fear of prejudice from majority concentrated neighbourhoods. Boschman et al. (2016) show many ethnic minorities avoid moving to neighbourhoods with native majority populations for fear that they will not be accepted by their neighbours. However, it is also argued that ethnic minorities choose to stay within the same neighbourhood or move to certain areas with high ethnic minority concentrations not due to fear but due to social ties within the neighbourhood (Dawkins 2006). Ethnic minorities especially those living in more deprived neighbourhoods are more likely to rely on having a good social network which can provide low-cost alternatives to expensive recreational activities or childcare (Boschman et al., 2016; Portes, 1998).

The place stratification model highlights the housing market limitations experienced by ethnic minorities. South and Crowder (1998) argue that ethnic minorities can be limited in their choice of housing due to discrimination and therefore struggle to improve their housing situation and neighbourhood environment. Kullberg et al (2009) find that private landlords often prefer native renters over ethnic minorities. Aalbers (2002) conducting a study in the Netherlands, found that lenders and banks have less trust in ethnic minorities, and therefore members of the minority groups are less likely to get a mortgage than native residents.

Finally, the enclave model is based on the housing and neighbourhood preferences of ethnic minority groups. It argues that ethnic minorities prefer to live with people with the same background as them,

in close proximity to specific local amenities despite the quality of housing available (Schaake et al., 2010). Bolt and van Kempen (2010) state that ethnic minorities clustering in the same area is seen to be beneficial by both the current residents of a neighbourhood and any new migrants, as the amenities and organisations available are easily accessible to the neighbourhoods in which they live. Many residents decide to stay in these ethnically concentrated neighbourhoods due to satisfaction in their surroundings even when they can afford to move to a more expensive house or area (Schaake et al., 2010).

As a response to the residential locations of minority groups, the White-flight literature (Crowder, 2000) suggests that when the proportion of ethnic minority residents increase in an area, White individuals decide to leave their neighbourhood (Van Ham and Clark, 2009), also known as White avoidance. The implication is that the residential mobility of the majority White population is due to leaving or avoiding neighbourhoods with ethnic minority populations. Harris (2001) however states that when the socioeconomic composition is controlled for, the ethnic composition should not impact on the desirability of a neighbourhood, known as the racial proxy hypothesis. It is therefore essential that the socio-economic and ethnic composition of a neighbourhood are analysed together (Van Ham and Clark, 2009). Crowder (2000) also adds that people move from ethnic minority neighbourhoods not because they have an aversion to them but because the neighbourhood is deprived. Finney and Simpson (2009) suggest that the growth of ethnic minority concentration neighbourhoods in the UK is not due to ethnically selective mobility patterns but due to natural change.

It is clear from the literature that ethnic minorities and individuals from lower socio-economic backgrounds face more restrictive mobility opportunities on average due to a range of different factors, from financial restriction and housing availability to potential discriminatory factors. It is therefore important when researching mobility to be aware of these differences when reporting on life outcomes.

2.5 School Mobility

When understanding how children adapt to mobility and changes in the neighbourhood, it is important to also focus on the school, and how both neighbourhood and school moves impact on educational attainment. Alongside neighbourhoods, schools are the other key space for children. Where a child goes to school, and their educational attainment is equally as important when researching and better understanding of life outcomes. As Sharkey (2012) states, the focus should be on contextual mobility when investigating the outcomes of children. In some cases, researchers have isolated the effects of the neighbourhood from other important aspects of children's lives such as

school and, worse, to research them separately (Sharkey and Faber, 2014; Van ham and Manley, 2012). Sharkey and Faber (2014) argue that isolating the effects of neighbourhoods from other social contexts such as family and school, ignores that the individual social environment is associated with time and space.

The majority of children in the UK will change school at least once when they transition between primary and secondary school or equivalent, known as a compulsory school move. The literature, therefore, refers to school moves made at non-compulsory time points over the educational life course. The reasons for moving schools at non-compulsory points differ in a similar way to those listed for home moves (Machin et al., 2006). Some families actively choose to move house to be closer to a better performing school, to benefit their child's education, often paying a significant house price to do so (Machin et al., 2006; Gibbons and Machin, 2003). The change is with the ultimate intention to better their child's education. Some children may stay within the same neighbourhood but change school for the same overall intention of improving education.

For similar reasons to those who move house and often directly related to these reasons, many children move schools at non-compulsory time points because of a change in circumstance. For example, parents may find new employment elsewhere in the country and therefore need to move their family to other regions which also requires a school change. Family breakdown such as divorce may also influence a move over longer distances which means a school move is also necessary. Machin et al. (2006) find that pupils from lower-income families at all levels of schooling are more likely to move school than pupils from higher-income families (Machin et al., 2006). A study carried out by Shelter (2014) found that some families are being re-housed or provided temporary accommodation by the council which is up to 100 miles away from the area they are currently living in which would also require a child to move school, which then creates a double set of disadvantages as a child has to move both home and school. Moving school in some cases has nothing to do with moving home but due to issues such as bullying or exclusion. Gasper et al. (2010) state that pupils who move schools are more likely to have been bullied. Pupils who are excluded, where there is not a pupil referral unit on site will have to find an alternative school, therefore, requiring a move.

2.6 School mobility: Impact of moving

The link between school mobility and negative outcomes in educational attainment has several likely explanations (Herbers et al., 2013). Changing schools may cause disruptions in learning experiences, as pupils often have to adapt to a new curriculum and different expectations in a new school (Herbers et al. 2013; Burkam et al. 2009; Mehana & Reynolds, 2004). Schools differ in the way they teach and

what they expect from their pupils, adjusting to these changes by moving to a new school may interfere with learning, particularly for those who change schools in the middle of an academic year (Herbers et al., 2013; Temple & Reynolds, 2000). Herbers et al. (2013) state that changes in instructional environments can be detrimental to pupil well-being. Depending on the reason for moving, changing schools can also result in lost time in the classroom which may make it more difficult for pupils to catch up on missed lessons (Gasper et al., 2010).

Changing school also creates disruptions in relationships with teachers and peers (Herbers et al., 2013). Friendship groups are often established early on in primary and secondary school, so joining a school later in the educational life cycle can make forming new peer relationships more difficult. South et al., (2007) state that secondary school students who move school are more likely to interact with pupils with lower educational attainment and who are less interested and engaged in the classroom. They are also more likely to have smaller groups of friends. Immigrants who often have an added language barrier and different cultural experiences may find this even more problematic (Gasper et al., 2010). Gasper et al. (2010) study social and residential mobility in the US in relation to delinquency finding that those that move more often, both neighbourhood and home, are more likely to be less engaged in school and achieve poorer results. They note, however, that the study only tracks children from age 12, and how useful it would be to have done this from an early age (Gasper et al., 2010). Researchers have found that school mobility, lowers educational attainment and hinders developmental outcomes and school dropout (Pribesh and Downey, 1999; Gasper et al., 2010).

It has been suggested that moving school in the early part of the educational life course may be most detrimental to student well-being as pupils are building the academic foundations that are important for their future schooling during these seminal years (Herbers et al., 2013; Mehana & Reynolds, 2004). However, Pribesh and Downey (1999) have found more negative outcomes for pupils who move in the later years of their educational life course. It may be more difficult for older students to catch up academically as their curriculum may vary across schools. In the latter years of secondary school friendships become more established making it harder for pupils to leave which can also have an impact on academic performance and engagement in the new school (Herbers et al., 2013; South et al., 2007).

Another likely explanation for the link between poor educational outcomes and changing school is lower socio-economic status as a family (Herbers et al., 2013). School mobility is more frequent among pupils who also experience a variety of other disadvantages, including residential instability, homelessness, and residing in single-parent, low-income homes (Temple & Reynolds, 2000; Mehana & Reynolds, 2004). The children experiencing some of these additional risks are more likely to move school more frequently, and this means that impacts of school mobility, such as adapting to a new

curriculum, peers and teachers are exacerbated, and as a result educational attainment is often negatively impacted.

Rumberger (2003) found that children in the early primary school years move school and home more frequently than those in secondary school. The study was carried out on a cohort of mobile pupils in the sixth grade (or year 7 in the UK), nearly half of all pupils reported changing schools for school-related reasons such dissatisfaction, 28% reported moving school because they had moved house, a third reported changing schools for a combination of home or school-related reasons. Very few reported moving school as a personal choice and even fewer indicated that they changed schools because of exclusion (Herbers et al., 2013; Rumberger, 2003). In the United States, a third of pupils under the age of 13 move school more than once between 1st and 8th grade (the UK equivalent of year 2 and year 9) (Smith, 1995). In the US over seventy per cent of children living in poverty change schools at least once before the age of 11, with a fifth changing schools three or more times (Gasper et al., 2010).

Using the National Pupil Database, Machin et al. (2006) analyse the association between moving school and individual characteristics, finding that pupils who move school are more disadvantaged and have a poorer prior education record than pupils who do not. Machin et al. (2006) also find that when moving school, pupils are more likely to move to a school with better academic performance than their former school, but this was more prominent for pupils from families with a higher socio-economic status. Strand and Demie (2007) also use the National Pupil Database to examine the association between school moves and educational attainment at secondary school, finding that moving school has a negative association with GCSE scores, even after taking into consideration prior attainment at age 11 and individual characteristics.

2.7 Combining Residential and School Mobility

Very few studies separate out origin neighbourhood from the current neighbourhood and individual characteristics, such as ethnicity and socioeconomic status (Duncan et al., 1994; Holzer et al., 2008; Cordes et al., 2016). Studies of residential mobility often only look at specific time points and miss out some important years between these time points. For example, a child may have moved several times over their educational life course, but this may not be captured.

There are some studies that have focused on both home and school when analysing mobility. However, there are limitations in the data samples and methods used. Leckie (2009) used the National Pupil Database to explore the relationships between school, neighbourhood and educational attainment which is stronger for school than neighbourhood mobility, but this depends on the reason

for and timing of the moves with primary school effects persisting into secondary education (Leckie, 2009). Pupils in the study were based in the South West region of England, which has a lower than average number of ethnic minority groups. The findings from this unrepresentative sample may therefore not be generalisable to the rest of England. This research highlights that it is unnecessary and reductionist to try and disentangle school from neighbourhood effects when they are so closely associated.

Chetty and Hendren (2015) study over five million families that have moved house finding that college attendance rates and earnings increase for each year that is spent in a better neighbourhood. Therefore, children who move at a younger age have better economic outcomes as adults compared to those who move to a better neighbourhood as adolescents. Chetty et al. (2015) in a similar study showed that children who moved to a less deprived neighbourhood to that of their origin neighbourhood at or before the age of nine had 50% better economic outcomes as adults than those who grew up and remained in the most deprived neighbourhoods. Although both studies consider home and school moves, residential moves are classed by a change in US County, which are large geographical areas of population, (the average US county population was just under 100,000 in 2015, Los Angeles County, California, has the largest population with 10,170,292 residents living there in 2015 (US Census, 2016). Using spatially coarse aggregated data means some of the finer spatial differences and individual behaviours when reporting on outcomes are missed. In addition, only moves between counties are recorded rather than within counties, so many moves will be missed.

Cordes et al. (2016) studied all first-year pupils attending New York City public schools between 1996/7 and 2007/8. They found in contrast to the Chetty and Hendren (2015) and Chetty et al. (2016) studies that moving to a more affluent neighbourhood does not relate to improved outcomes in adulthood. Cordes et al. (2016) found that moving neighbourhoods decreases educational attainment and performance, especially among students who move to more deprived neighbourhoods. All three US studies utilise spatially coarse aggregated data, using US States as their geographic scale, which means some of the finer spatial differences and individual behaviours when reporting on outcomes are missed. It is clear from the literature that although some studies have considered both home and school moves when evaluating the impact on later life outcomes, there remain limitations of the data and methodologies used which obstruct firm conclusions to be drawn about how mobility is associated with later life outcomes.

2.8 Summary

To summarise, there is a considerable literature on residential mobility, outlining why people move and the impact moving has on individuals in terms of their life outcomes. Although moving was initially seen to be part of a positive upward move to a better home and better neighbourhood (Rossi, 1955), it is now understood that residential mobility can also be linked to negative outcomes, often due to poor social and economic situations (Coulton et al., 2012). Moving is not always part of status attainment that is made through choice, with some moves being forced and often distressing for families and their children.

There is a gap between the current mobility and neighbourhood effects literature. There have been numerous studies on how moving home and school can impact on health, social and educational outcomes and a wealth of studies on how living in a deprived neighbourhood in childhood can impact on later life outcomes. However, as Yang et al. (1999) argue, studies evaluating the impact of whether a pupil has moved or not do not explore the different types and timings of residential moves. This still stands and there is a gap in the current literature that does not focus on type of moves, comparing the origin and destination neighbourhood. More recently in the US, Chetty and Hendren (2015) and Cordes et al., (2015) have focused on neighbourhood change in terms of deprivation as a result of the Moving to Opportunity study. However, both use large geographic areas to class neighbourhoods which mean the data is aggregated and misses the finer spatial details. There has been very little research linking mobility to neighbourhood change from a UK context.

As previously highlighted when assessing mobility in relation to life outcomes, school mobility is a key factor. School mobility can also be problematic for children as they have to adapt to new surroundings, curriculum, teachers and peers, which can impact on educational outcomes and can be particularly troublesome for pupils from lower socio-economic backgrounds. However, there has been very little research considering both residential and school mobility together. There have been some large-scale aggregate data analysis carried out in the US (Cordes et al., 2015, Chetty and Hendren, 2015) but very little has been done within a UK context on a longitudinal basis. Data which highlight both school and residential moves and also provides individual-level data as well as educational achievement and deprivation information will allow for a good macro and micro level understanding of an individual and will provide a fully rounded contextual and spatial approach to mobility research.

Chapter 3: Data and Methods

3.1 Introduction

This chapter introduces the data and statistical methods used in this thesis. First, an overview of the data is provided with a rationale for the variables used throughout this thesis. Second, the strengths and weaknesses of the data are discussed and finally, an introduction to regression analyses and multilevel modelling, which are the main framework for all analyses throughout this thesis.

3.2 Data

The dataset used for this study is from the UK National Pupil Database (NPD) and is comprised of 583,796 records for a cohort of pupils across England who started school in 2002, and who are tracked annually until they finish compulsory schooling in 2013, aged 16. The dataset is, therefore, longitudinal spanning eleven consecutive years. Only publicly funded schools and colleges have a statutory duty to provide data to the Department for Education and have done so since 2002 (Singleton, 2010), meaning that these data and subsequent analyses will be missing a small (approximately 7%) proportion of young people who attended independent schools. These data are stored by the NPD in a number of data sets. Every student record contains demographic information, including ethnicity (which is information provided by a parent or carer on registration at a school), gender, first language spoken, free school meal (FSM) status (i.e. eligibility for a free lunch), as well as academic information including school attended and Key Stage 1 (taken at age 7) to Key Stage 4 (taken at age 16) results, also more commonly known as General Certificate of Secondary Education (GCSEs). Importantly, the data also contains geographical information regarding the pupil's Lower Super Output Area (LSOA) location each school year (described in more detail in this chapter) and the Unique Reference Number (URN) for the school in which they are enrolled.

Table 1 provides a summary of the variables in the cohort dataset. There are fractionally more males (50.6%) than females (49.4%) within the cohort. The majority of the pupils in the cohort are White British (82%), the next largest ethnic minority group is Indian (2%), closely followed by White Other (1.8%) and Black African (1.6%). The smallest ethnic group are Travellers/Romany Gypsy, with just 353 pupils in the cohort. A tenth of the cohort does not have English as a first language.

Gender		Number	(%)
	Female	234714	49.4
	Male	240852	50.6
Ethnicity	Bangladeshi	5,874	1.24
	Indian	10,117	2.13
	Asian Other	3,155	0.66
	Pakistani	13,324	2.8
	Black African	7,795	1.64
	Black Caribbean	6,461	1.36
	Black Other	1,850	0.39
	Chinese	1,276	0.27
	Mixed Other	5,234	1.1
	Mixed White Asian	3,464	0.73
	Mixed White Black African	1,673	0.35
	Mixed White Black Caribbean	6,335	1.33
	Other	3,382	0.71
	Unknown	3,480	0.73
	White British	391,787	82.38
	White Irish	1,523	0.32
	White Irish Traveller/Romany Gypsy	353	0.07
	White Other	8,483	1.78
Language	English as First Language	431,940	91
	Other	43,626	9
Free School Meals (FSM)	Eligible for FSM every school year	19,737	4.2
	Eligible for FSM for some of school	124,872	26.2
	Never eligible for FSM	330,957	69.6
Key Stage 4	Key Stage 4 covers the last two years of compulsory schooling (Years 10 and 11) when pupils are aged 14-16. Exams are usually taken at the end of Year 11.		
LSOA Code	Residential locations are provided by LSOA code. LSOA's have on average 1500 residents.		
School URN	Schools are identified by a unique reference number.		

Table 1: Summary of variables included in the NPD

There has been a great deal of literature on residential segregation and where ethnic minority groups live (Bolt and van Kempen, 2010; Johnston et al., 2009; Finney and Simpson, 2009) but less is known about the mobility patterns of ethnic groups over time. This thesis will focus specifically on the mobility patterns of ethnic minorities as this is an important area of research, as spatial mobility can

be seen as a key indicator of ethnic minorities' incorporation into the host society (Bolt and van Kempen, 2010). Researchers have that differences in residential mobility behaviour and outcomes for ethnic minorities (Boschman et al, 2016; Bolt and Van Kempen 2010).

Research in the United States has found that Black children and young people are less likely to move to the suburbs of an area than the White population (Logan and Alba 1993) and more likely to move to deprived or Black concentration neighbourhoods (South and Crowder 1998; Clark et al. 2006). Research in Europe has found that ethnic minorities are more likely than the ethnic majority population to move to deprived neighbourhoods (Bolt and Van Kempen 2010; Schaake et al. 2014). It will be useful not only to analyse where ethnic minorities within the NPD cohort are most concentrated but also how often they move and where they tend to move to, to have a better understanding of residential mobility patterns among minority ethnic groups.

Table 1 shows that 70% of the cohort have never been eligible for free school meals. Conversely, just over 4% have been eligible every school year throughout the educational life course, and 26% have been eligible at some point during their schooling. Free school meal (FSM) eligibility is widely used as a proxy for socio-economic status (SES) in academia and Government policy in the UK (Taylor, 2018). It is also used as a mechanism for funding schools (Taylor, 2018) and is officially and routinely collected every year for nearly all pupils and is strongly related to educational outcomes (Gorard, 2012). FSM eligibility includes those that are claiming FSM and also those that are eligible but decide not to claim for various social and cultural reasons.

Hobbs and Vignoles (2009) suggest that the majority of children claiming free school meals will be dependents of parents or carers claiming income support or income-based Jobseeker's Allowance and the majority of children will be in "one parent families (Hobbs & Vignoles, 2009). For family income, FSM status best proxies incomes below £200 per week, the bottom income quartile for family employment. FSM status is indicative of workless families and those with only one part-time worker (Hobbs & Vignoles, 2009). Using FSM eligibility is, therefore, a good indicator of pupils' socio-economic situation. It is argued that some FSM pupils may not always be from the lowest income families once other welfare benefits are accounted for. FSM eligibility, however, is not only seen as an income equivalent but also as an indicator of welfare dependency (Gorard, 2012). FSM eligibility of the pupils is included for each of the years they are in school. The criteria for eligibility do, however, change over the period.

Key stage 4 results will be used in chapter 7 as the main outcome variable in this thesis, in order to understand the impact moving home and school has on young people by comparing exam results. Normally a student will study for on average 8 GCSEs in core subjects such as Maths, English and Science as well as an additional language and humanities subjects (Gill and Williamson, 2016). GCSEs and equivalent are converted into point scores.

Each GCSE grade is assigned a number of points. The highest possible score is 464 which is equivalent to eight A*s which are 58 points each. A breakdown of point scores can be seen in Table 3.2. In this thesis capped GCSE point scores will be used, which is the eight best GCSE grades for each student. The capped GCSE scores run from 0 - 464, for example, a score of the maximum 464 would indicate that the student's eight best GCSE grades were, on average, all A*s. It is possible for pupils to take more than 8 GCSEs, but the capped score only considers the eight best scores. In the UK, achieving five A*-C grades is a benchmark target set for certain employment opportunities or to gain a place in higher education. The UK Government also collect statistics to measure progress or quality of a school by how many pupils achieve five A*-Cs[1]. Successful completion of schooling is important for later life outcomes. Those with lower educational attainment are more likely to have lower earnings and reduced employment opportunities (Marmot, 2010), while pupils who have successfully completed compulsory schooling are more likely to have increased aspirations and life satisfaction (Department for Education, 2010). Thus, five A*-Cs can be viewed as a gateway proxy for later life outcomes.

GCSE grade	GCSE point score
A*	58
A	52
B	46
C	40
D	34
E	28
F	22
G	16

Table 2: KS4 point score values for each GCSE grade

In a study carried out by the Department for Education on a cohort of young people aged 18 in 2009, nearly two-thirds of the highest qualified (those with eight or more GCSEs at Grades A* to C) were in full-time education at age 18. The proportion decreases to a fifth for those who achieved between

[1] The grading system for GCSEs in England has recently changed, however the NPD cohort studied in this thesis were still graded by the lettering system (A*-G) so this system will be referred to throughout this thesis.

one and four GCSEs at Grades D to G (Department for Education, 2010). Those with no grades above a D and pupils who achieved no GCSEs at all were the most likely to not be in education, employment or training (NEET) at age 18 (Department for Education, 2010).

Education is a major policy issue for the Government in the UK (Butler and Hamnett, 2007). Education is considered to be important for economic growth and reducing social inequality and disadvantage (SEU, 2001). Education is often at the heart of policies for improving social mobility, integration and reducing social exclusion (Butler and Hamnett, 2007). A key issue for the UK Government is an awareness that, unless they address the issue of educational inequalities, the population who do not have good educational attainment are likely to experience labour market exclusion and will only be able to achieve a minimum wage standard of living (Butler and Hamnett, 2007). Inequalities in educational outcomes are therefore a key political, economic and social concern, and will be a good indicator of inequality within the NPD cohort. Educational attainment will be focused on in more detail in chapter 7 when residential, and school mobility will be analysed against educational attainment.

To represent the local residential environment within which mobility takes place the NPD data are geocoded and include the Lower Super Output Area (LSOA) codes of the pupil's home for each school year. LSOAs have on average, 1500 residents (Flouri et al., 2012). LSOA is the smallest scale at which georeferenced data could be obtained from the NPD. There are currently 32,844 LSOAs in England (ONS, 2011). LSOAs, are statistical units designed to contain roughly equal-sized populations and capture similar types of neighbourhood (Bajekal et al., 2013). They enable a comparison of areas of similar size nationally and help to address some of the disclosure control issues which can result from using smaller geographies (National Statistics, 2007). As with all studies using spatial data, there is the issue of the Modifiable Areal Unit Problem (MAUP), which is a phenomenon whereby different results are obtained in the analysis of the same data when grouped into different sets of spatial areas (Manley et al., 2006; Openshaw, 1984). However, LSOAs as spatial units are used for the analysis of census data to inform public policy decisions at both National and Local Government level, therefore an appropriate geographical unit to use when linking mobility and deprivation to educational outcomes.

One of the major uses of LSOAs in policy research is linking to the Index of Multiple Deprivation (IMD) which is based on data collected at LSOA level and therefore links well to the NPD. The IMD is the UK government's current preferred indicator of deprivation in England (Norman, 2010). The Index of Multiple Deprivation (IMD) combines information from seven domains to produce an overall measure of deprivation. The domains are Income, employment, education, skills and training deprivation,

health and disability, crime, barriers to housing and services and living environment (Department for Communities and Local Government, 2016).

The IMD is widely used in government policy to implement programmes in the most deprived areas. It is often used locally, as evidence to target interventions and develop strategies. The community and voluntary sector also use the index to identify areas where people may benefit from additional services or support (DCLG, 2015). The indices can be directly compared with each other, to evaluate if one area is more deprived than another. Scores can also be grouped into deciles or quintiles, so, for example, it is possible to analyse which are the most or least deprived neighbourhoods nationally. The IMD, therefore, works well as a marker of deprivation in this thesis where comparisons are made geographically and grouped in terms of the level of deprivation.

The IMD does not identify deprived individuals but is based on aggregated data. Neighbourhood deprivation is not prognostic: wealthier people may live in deprived areas as they measure only the group average. Using group level data to draw individual-level inferences risks the ecological fallacy (Robinson, 1950), but as this thesis uses individual-level data from the NPD, this is avoided.

The IMD has been released at several time points since 2000, in order to be able to compare the quality of neighbourhoods across the educational life course, one static score must be applied to all LSOAs. This thesis uses the 2010 IMD score applied to all years because it is based on 2008 data, placing the score in the middle of the study period running from 2002-2013. Neighbourhood characteristics may change over an 11-year period, but previous research has demonstrated that neighbourhood deprivation remains relatively consistent over time, meaning that using the same IMD score as a midpoint should be robust to alternative measures of the IMD (Norman, 2010). As the same IMD measure is being used throughout this thesis, the issue of the IMD not being comparable over time and there being changing geographical boundaries will not be a problem in this thesis (Norman, 2015).

Of the starting cohort of 583,796 pupils, 67,894 (11.6%) had incomplete data by the end of the period due to either leaving the country or moving to a school before the end of/or during the educational life cycle, such as moving to an independent school that does not have to report to NPD. As this is a longitudinal study, those with missing records were removed from the cohort data set. A further 40,336 (6.9%) did not have a linked education record for KS4, and very few had a score of zero at KS4: these individuals were removed from the analysis. These pupils may have been absent due to illness, and a score of zero would, therefore, skew results.

3.2 Strengths and Limitations

The data used in this study is longitudinal and tracks the same cohort of pupils from the beginning of school in 2002, at age 5 to the end of compulsory schooling in 2013, at age 16. The data is unique to this specific cohort and has not been used for any previous study, to the best of found knowledge. Often data used in studies of mobility use cross-sectional analysis or look at specific time points within the educational life course rather than study each year continuously. As this study is longitudinal, it takes a longer view of patterns of pupil mobility between schools and neighbourhoods. The data covers the whole of England, therefore is generalisable and externally valid.

A limitation of the data is that it does not include all school types. State and publicly funded schools have a statutory duty to provide data; independent schools, however, do not. This, therefore, means that not all pupils will be represented within this data set. However as 93% of the population attend state schools, this is still a largely complete and representative sample. Another limitation is that exact home location could not be provided, only LSOA code, for data privacy reasons. Although this is a fairly local geographical scale, very short moves within an LSOA will be missed. However, this thesis is interested in moves that change the context in which an individual lives and which are potentially more disruptive in terms of social networks, therefore omitting these moves is not overly problematic.

Another limitation of the NPD data is that it misses a small number of hypermobile pupils; only one record is provided for each school year, a child could move home a couple of times during a school year, but the data would only show this as there being one move, as it will compare the LSOA code in September 2003 with the LSOA code in September 2004, for example, so will miss any other LSOA moves that may have taken place during the school year, although this is again likely to be a very small proportion of pupils.

3.3 Methods

Throughout this thesis, a mix of descriptive statistics, regression analysis and multilevel modelling approaches will be used to analyse NPD data. Regression analysis examines the association between independent and dependent variables. A linear regression model can be written as follows:

$$y = \beta_0 + \beta_1 x + e$$

where y is a continuous outcome, β_0 is the intercept, β_1 represents the coefficient of a variable$x$, and e is a residual which is normally distributed and an expected value of zero.

The above regression assumes that all errors are independently and identically distributed from one another. However, this is an assumption that is violated when there is clustering of the data. Because

analyses in this thesis are longitudinal, clustering will exist at the person level. To account for clustering, multilevel modelling and cluster-robust standard errors are used in analysis throughout this thesis (Goldstein, 2011).

A simple linear multilevel model equation can be written as follows:

$$y_{ij} = \beta_{0j} + \beta_1 x_{ij} + u_j + e_{ij}$$

$$u_j \sim N(0, \sigma_u^2)$$

Where y is the continuous outcome, j denotes individuals and ij denotes occasions within individuals. The only additional parameter to the model from the previous regression equation is u_j, which is a normally distributed level 2 residual that denotes the deviation from the global regression line for a specific level 2 unit. The e_{ij} denotes the level 1 deviation from the regression line.

A simple logit multilevel model equation can be written as follows:

$$log\left(\frac{y_{ij}}{1 - y_{ij}}\right) = \beta_0 + \beta_1 x_{ij} + u_j$$

$$u_j \sim N(0, \sigma_u^2)$$

Where y is the categorical outcome, j denotes individuals and ij denotes occasions within individuals. The only additional parameter to the model from the previous regression equation is u_j, which is a normally distributed level 2 residual that denotes the deviation from the global regression line for a specific level 2 unit. The e_{ij} denotes the level 1 deviation from the regression line.

Chapter 4 and Chapter 6 utilise a three-level logit model to evaluate LSOA moves and school moves respectively, against ethnicity and FSM eligibility at the occasion, pupil and Local Authority level to address the first and third research questions. Chapter 5 utilises a two-level linear model to evaluate distance moved in miles against ethnicity, FSM eligibility and neighbourhood type to address the second research question. Finally, in chapter 7, a series of linear and logit regression models with clustered robust standard errors are run. KS4 point scores and five A*-C grades are used as the dependent variables run with a series of independent variables to explain the variation in results. The models will help to address the fourth and final research question. In each chapter where multilevel models are used a more specific equation to the model being run is noted and explained, as levels and coefficients will vary in each model.

Chapter 4: Who is moving LSOA?

4.1 Introduction

In this chapter, moves between LSOAs are evaluated based on ethnicity, Free School Meal (FSM) eligibility and geography to get a better understanding of whether certain social and ethnic groups have a higher propensity to move than others and if this varies across time and space. As highlighted in chapter 3, residential location is known by LSOA code, so a change in LSOA code would indicate a residential move. In later chapters school moves will also be evaluated and the impact mobility has on educational outcomes will be analysed to understand the impact moving has on pupils. However, it is necessary first to analyse if certain social and ethnic groups move more than others to address the first research question of this thesis: "Is socioeconomic status, ethnicity and geography associated with residential mobility?"

Chapter 2 included previous studies which highlight that a fear of discrimination can prevent ethnic minority groups from moving to certain areas (Phillips et al., 2007), and that residential mobility and segregation are often interlinked, with ethnic minorities often choosing to stay in, or move to, more ethnically concentrated areas (Bolt and van Kempen, 2010). This hypothesis will be tested firstly with descriptive statistics and secondly with a multi-level logit model to evaluate if there are any differences among ethnic groups in their propensity to move and to highlight any patterns and differences. It has also been documented as highlighted in chapter 2 that those with lower socio-economic status (SES) are more likely to move as a result of negative issues such as financial hardship (Coulton et al., 2012). FSM is used as a marker of SES to analyse if moving between LSOAs is positively associated with SES. Between LSOA moves are also evaluated by Local Authority to analyse if there are any geographical differences in propensity to move and whether this is linked to ethnic and social group concentrations.

Finally, this chapter also includes a case study which looks at the residential mobility of Bangladeshi pupils in Tower Hamlets to determine how often and where pupils are moving. Focusing on a specific ethnic group within a smaller geographical area will also allow for some indication of why pupils move linking to previous and current literature. Tower Hamlets has an above average social housing and private rental housing stock, so this will test the hypothesis illustrated by Clark (2013), who documents how a drive for a 'homeownership society' has created disparities in housing wealth across ethnic and social groups, with more ethnic groups living in private and social rentals. Rented housing is documented to be far more unstable than homeownership. Focusing on individual moves more specifically will also take the analysis one step further to show where Bangladeshi pupils move.

4.2 Number of LSOA moves and when they take place

To analyse whether a residential move had taken place between two consecutive school years, the LSOA codes between two years were compared and where a change was found a move was recorded. If the code had not changed from the year before a value score of 0 was given. If the LSOA code had changed, this indicated a move had taken place and therefore was given a value of 1. They could then be combined to give an overall number of moves made by each pupil within the cohort across the compulsory educational life course. Table 3 reports the cumulative moves and shows that 54% of the cohort never move LSOA during the educational life course, 46% move LSOA at least once. Approximately 9% of the cohort move more than three times. Only five pupils within the cohort move LSOA every school year.

Moves	Number	Freq	Cum. Freq
10	5	0.001	0.001
9	27	0.005	0.006
8	156	0.03	0.036
7	483	0.1	0.136
6	1504	0.32	0.456
5	4128	0.87	1.326
4	10199	2.14	3.466
3	24354	5.12	8.586
2	54034	11.36	19.95
1	124050	26.08	46.03
0	256626	53.96	100
Total:	475566	100	100

Table 3: LSOA moves made by NPD pupils over the educational life course

Table 4 lists the number of pupils who move LSOA each school year during the educational life cycle. Over 10% of the NPD cohort move LSOA per year during the first three years of primary school, the number of pupils moving then decreases year on year, apart from between 2006-2007, which is likely to reflect moving house in order to be in particular catchment area for secondary school admission. The number of pupils moving LSOA almost halves by the final year of school.

LSOA moves by school year				
School stage	School years	Years	Number of pupils	%
Primary School (Secondary school applications will be submitted during year 5)	1-2	2003-2004	48,921	10.29
	2-3	2004-2005	48,488	10.20
	3-4	2005-2006	39,307	8.27
	4-5	2006-2007	43,384	9.12
	5-6	2007-2008	41,683	8.76
	6-7	2008-2009	41,627	8.75
Secondary School	7-8	2009-2010	30,937	6.51
	8-9	2010-2011	29,902	6.29
	9-10	2011-2012	28,976	6.09
	10-11	2012-2013	27,337	5.75

Table 4: LSOA moves made each school year across the educational life course

4.3 Ethnic and social geographies of the cohort

In order to get a better sense of where certain ethnic and social groups are living, maps have been created by calculating each individual ethnic group within the NPD cohort as a percentage of the total population living within each Local Authority (LA). This way it is possible to get a sense of where certain ethnic groups within the cohort live but also how mixed certain LAs are compared to others. The NPD cohort lives in 326 different LAs across England. The maps (figures 1-8) are based on the LA in which pupils lived during their first year of schooling in 2002. The LA in which ethnic groups lived during their last year of compulsory schooling in 2013 was also analysed, however, the patterns, once mapped, were in aggregate very similar to 2002 so have not been included. (A comparison of LA settlement between 2002 and 2013 will be focused on in more detail later in this chapter). The maps below (figures 1-8) have been created as visually balanced cartograms (Harris et al., 2017), by square-rooting the area of each LA so it is possible to see all LAs more clearly. The maps enlarge some of the smaller areas while trying to avoid too much distortion of the others. Often on a standard map, it is difficult to clearly see the LAs, especially within Greater London, because rural areas are usually of greater physical size than urban areas and therefore dominate the map.

The maps for Bangladeshi, Indian, Pakistani, Black African, Black Caribbean and White Other have all been classified in the same way so a direct comparison can be made. The upper limit varies by group, for example, one LA has over 64% Bangladeshi pupils whereas for Black Caribbean pupils the largest percentage of the group among the LAs is 21%. The maps have a zero category to highlight LAs across England that have no population of the specific ethnic group being mapped. The upper classification

starts at 20.01%, as this would highlight a larger than the expected population of an ethnic group within any LA, considering that the 2011 census states that the ethnic minority population in England is approximately 9% (ONS,2013). The same classification is also used to map FSM eligibility across England, as of January 2018, 13.6% of children in England were eligible for FSM (Department for Education, 2018). Therefore areas with 20% of eligible pupils or more would be higher than the national average.

The White British Population is mapped differently as they make up over 80% of the total NPD cohort population in England. All White British pupils would be in the top category if the previous classification was used. There are no LAs in England without a White British population, therefore, a zero category was not needed. There are several LAs with a White British population of over 98%, so this is the starting number of the upper category classification, so it was possible to identify areas where there are also a very small ethnic minority population.

Figure 1 shows the percentage of the NPD cohort who are Bangladeshi, within each LA across England. Oldham's NPD cohort population is just over 11% Bangladeshi shown in red at the top left of the map. The remaining LAs with the highest proportion of Bangladeshis are in London: 64% of the NPD cohort living in Tower Hamlets are Bangladeshi, just over 37% of NPD pupils living in the City of London are Bangladeshi, 20% in Camden and just over 15% in Newham.

Figure 2 shows the percentage of the NPD cohort who are Indian within each LA across England. In Leicester (Central England) shown in red, 28% of the NPD cohort living within the LA are Indian. In Greater London, 19% of the NPD cohort living within Harrow are Indian, in Hounslow, this is 18%. In the North West of England, 16% of the NPD cohort living in Blackburn and Darwen are Indian, with 12% in Preston. In the West Midlands, 16% of the NPD cohort living in Wolverhampton are Indian, with 12% in Sandwell.

Figure 3 shows the percentage of the NPD cohort who are Pakistani within each LA across England. In the North West of England 26% of the NPD cohort living in Bradford are Pakistani, and 22% in Pendle. In the Midlands, 18% of the NPD cohort living in Birmingham are Pakistani. On the outskirts of Greater London in Slough, 22% of the NPD cohort are Pakistani. Both Indian and Pakistani pupils within the NPD cohort are more spread across England, especially in the North West and Midlands, compared to other minority ethnic groups, who tend to be more concentrated within the Greater London area.

Figure 4 shows the percentage of the NPD cohort who are Black African within each LA across England. The LAs with the largest percentages of Black African pupils are concentrated in the Greater London Area with over 29% in Southwark, 22% in Lambeth, 20% in Hackney and 15% in Camden. Figure 5 shows the percentage of the NPD cohort who are Black Caribbean within each LA across England. The

LAs with the largest percentages of Black Caribbean pupils within the NPD cohort are also concentrated in the Greater London area with 21% in Lambeth, 18% in Hackney, 17% in Lewisham and 15% in Brent.

Figure 6 shows the percentage of the NPD cohort who are classed as White Other within each LA across England. As a whole the group are fairly evenly spread across the 326 LAs in England: 75% of the NPD cohort living on the Isles of Scilly are classed as White Other, however with the total NPD cohort population on the Isles of Scilly being only 4, this makes up a very small number. The remaining LAs with the largest percentages of White Other pupils are in Greater London, with 20% in Enfield, 17% in Haringey and 13% in Islington. It is worth noting that White Other is a diverse group, and includes Europeans, Americans, Canadians and those from Australasia. Those living on the Isles of Scilly may have a sense of Island identity and prefer to be classed as “Scillian”. The Chinese population within the cohort are fairly evenly spread across the county, with the highest percentage in any LA being 1.8% (living in Barnet, Greater London).

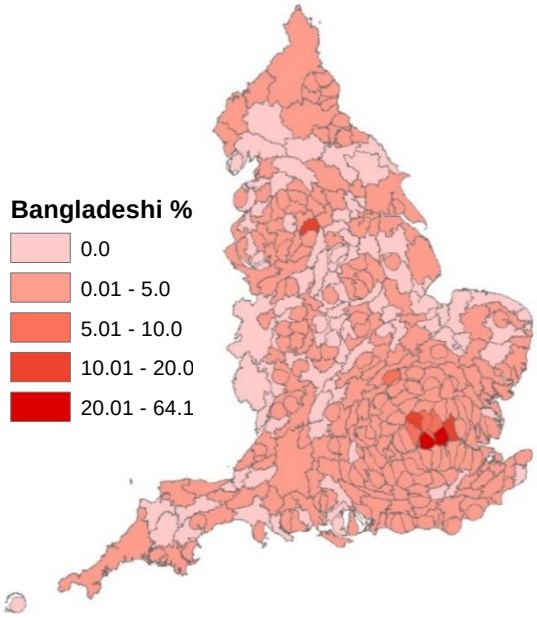

Figure 1 Bangladeshi pupils in NPD cohort

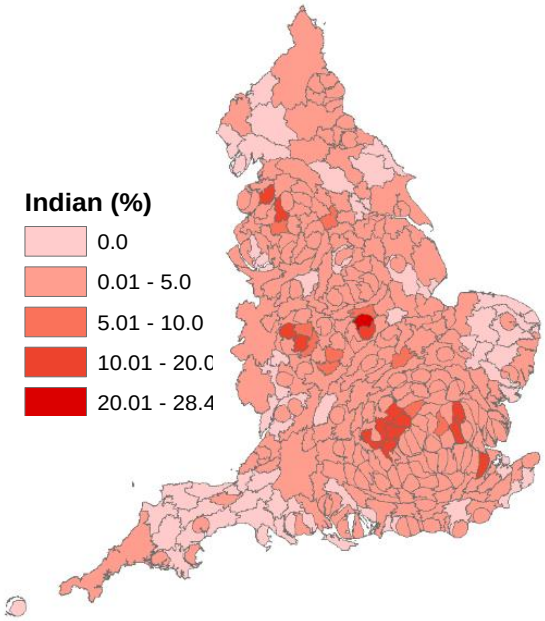

Figure 2 Indian pupils in NPD cohort

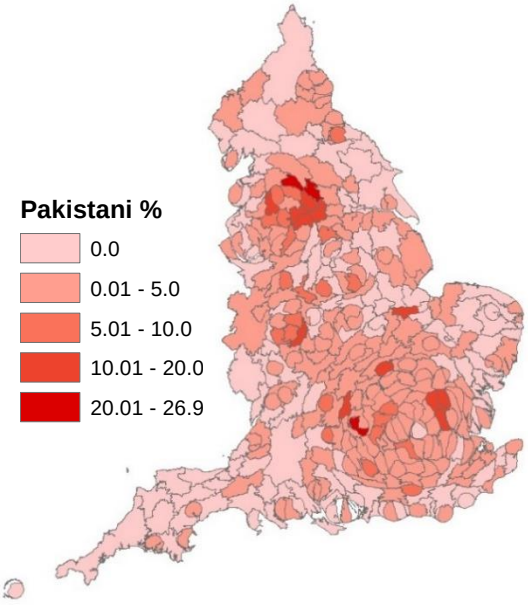

Figure 3 Pakistani pupils in NPD cohort

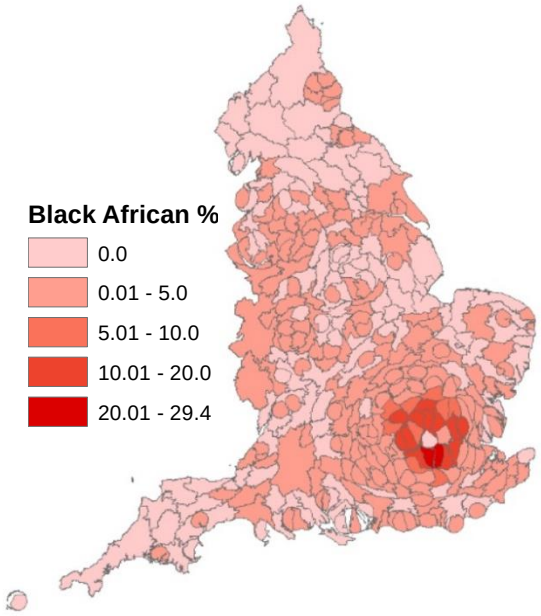

Figure 4 Black African pupils in NPD cohort

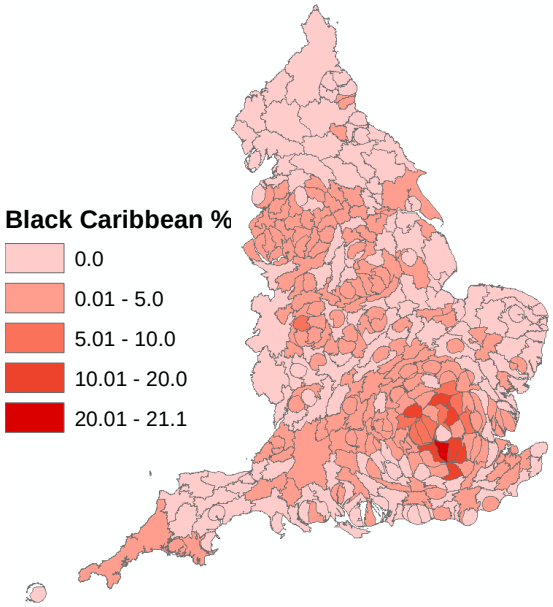

Figure 6 Black Caribbean pupils in the NPD cohort

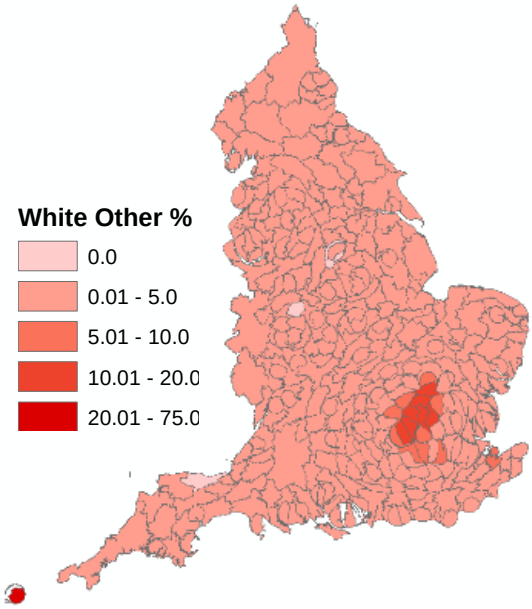

Figure 5 White Other pupils in the NPD cohort

Figure 7 shows the percentage of the NPD cohort who are White British within each LA across England. The map shows that the LAs with the smallest percentages of White British pupils are in Greater London highlighted in light pink on the map. Brent is the LA with the smallest percentage of White British NPD pupils, with just under 14%. There are also smaller populations of White British NPD pupils in Slough, Luton and Leicester. There are 21 LAs in England that have over 98% White British. These are highlighted in dark red on the map. Carlisle in the very North of England is the LA with the highest percentage (98.8%) of White British NPD pupils. Norfolk in East Anglia and Sedgemoor in Somerset also have over 98%, White British.

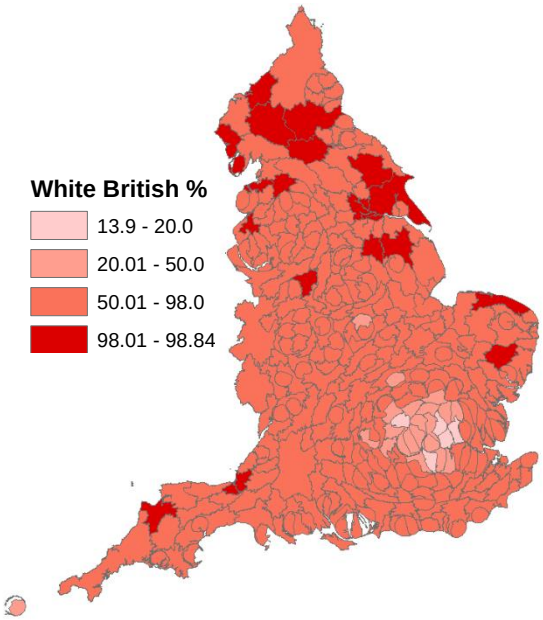

Figure 7: White British pupils in NPD cohort

Figure 8 shows the percentage of the NPD cohort within each LA across England who were eligible for FSM every school year across the educational life course. The data is based on the location pupils were living in during their final year of compulsory schooling in 2013, as this is the final location they were living after receiving FSM each school year. In the North East, over 13% of the NPD cohort living in Middlesbrough were eligible for FSM every school year. In the North West, 11% of the cohort living in Liverpool and Knowsley were eligible for FSM every school year, 14% of the NPD cohort living in Manchester and just over 10% of the cohort living in Birmingham were in receipt of FSM every school year. In Greater London, over 27% of the NPD cohort living in Tower Hamlets, 19% living in Camden, 19% in Westminster, 18% in Islington, 16% in Hackney were eligible for FSM each school year. Rutland, in the East Midlands, is the only LA without any FSM eligible pupils.

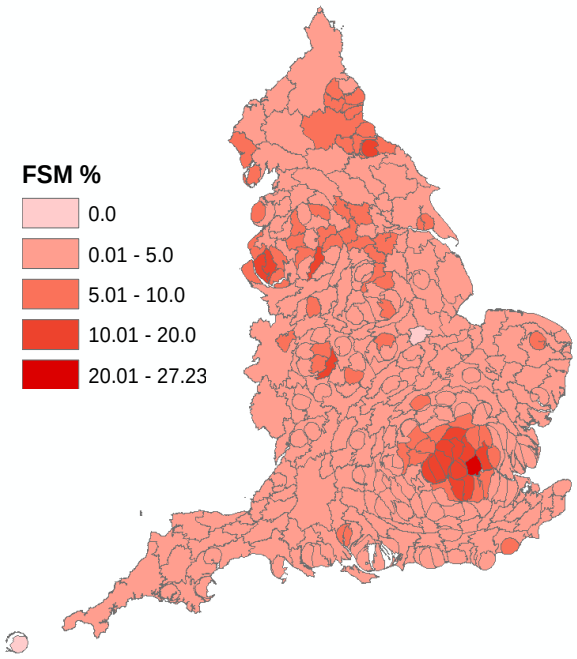

Figure 8: FSM eligibility in NPD cohort

4.4 LSOA moves by Ethnic and Social groups

The next series of tables highlight the number of LSOA moves made by each ethnic group and those eligible for FSM, in order to analyse whether certain ethnic and social groups move more than others. Table 5 reports the number of LSOA moves made over the educational life course decomposed by ethnic group. A very small proportion of the cohort moves more than five times, so any pupil who moves five or more times has been grouped into a 5+ moves category. Turning to the detail in the table, Black African pupils move the most, with approximately 65% moving at least once during the

educational life course. Traveller and Romany Gypsy pupils have the highest proportion of pupils (5.3%) moving five or more times, which is not surprising as this group is linked to having a higher number of residential moves. Almost 60% of the Indian pupils within the cohort never move during the educational life cycle. This is closely followed by 57% White Irish, 55% White British and 55% Pakistani pupils.

	Number of LSOA Moves (%)							
Ethnic Group	0	1	2	3	4	5+	Total (%)	Total Count
Black African	36.9	34.9	15.2	8.2	3.2	1.6	100	7,795
Asian Other	41.6	31.7	16.2	6.8	2.5	1.2	100	3,155
Black Other	43.0	30.5	14.8	6.8	3.0	1.9	100	1,850
Mixed White Black African	43.6	30.5	14.3	7.1	2.8	1.7	100	1,673
Gypsy/Traveller	44.2	23.5	14.4	9.1	4.5	4.2	100	353
Black Caribbean	46.8	29.2	12.4	6.6	2.9	2.1	100	6,461
Mixed White Black Caribbean	47.0	27.9	13.1	6.7	3.5	1.9	100	6,335
White Other	47.1	29.3	13.3	6.3	2.8	1.3	100	8,483
Other	47.7	28.2	13.7	6.9	2.4	1.0	100	6,862
Mixed Other	49.3	28.3	12.7	5.8	2.5	1.4	100	5,234
Bangladeshi	49.6	34.5	10.8	3.6	1.2	0.3	100	5,874
Mixed White Asian	52.5	26.6	12.1	5.0	2.2	1.6	100	3,464
Chinese	54.6	27.9	11.4	4.2	1.1	0.7	100	1,276
Pakistani	54.9	28.4	10.5	4.2	1.4	0.7	100	13,324
White British	55.0	25.3	11.2	5.0	2.1	1.4	100	391,787
White Irish	56.6	27.2	9.4	4.4	1.7	0.7	100	1,523
Indian	57.8	28.1	9.6	3.2	1.1	0.3	100	10,117

Table 5: LSOA Moves by Ethnic Group

Table 6 shows that a higher proportion of total moves take place for all ethnic minority groups at the beginning of the educational life course. There is variation among the groups with almost 18% of Black African pupils and 19% of Gypsy/Traveller pupils moving during their first year of school, compared with only 8.7% of Indian pupils. The second column in table 6 reports the moves made during the penultimate or last year of primary school. This is often a time that strategic moves are made in order

to be within a preferred catchment area for secondary schools (Allen et al., 2010). The final column is home moves made between year 9 and year 10, just before the start of GCSEs, when the percentage of moves decreases considerably for all groups. Only 7% of Black African pupils move before the start of GCSE study compared with only 3.3% of Indian pupils. For all groups, the number of moves decreases the further into the educational life cycle a pupil gets.

	2003-2004 (First year of school %)		2006-2007 (Penultimate year of Primary School %)		2010-2011 (Year before start of GCSEs %)		Ethnic Group Total (%)	Ethnic Group Total Count
Ethnic Group	No Move	Move	No Move	Move	No Move	Move		
Traveller/Gypsy	80.9	19.1	81.5	18.5	89.2	10.8	100	353
Black African	82.2	17.8	89.3	10.7	92.8	7.2	100	7,795
Asian Other	84.7	15.3	88.3	11.7	94.6	5.4	100	3,155
White Other	87.0	13.0	89.6	10.4	93.4	6.6	100	8,483
Black Other	87.2	12.8	88.6	11.4	91.3	8.7	100	1,850
Mixed White Black African	87.5	12.5	88.5	11.5	91.6	8.4	100	1,673
Other	87.6	12.4	90.1	9.9	93.6	6.4	100	6,862
Mixed Other	88.1	11.9	90.2	9.8	93.6	6.4	100	5,234
Mixed White Black Caribbean	88.5	11.5	89.6	10.4	91.8	8.2	100	6,335
Black Caribbean	88.6	11.4	89.3	10.7	92.5	7.5	100	6,461
Mixed White Asian	88.9	11.1	90.5	9.5	93.7	6.3	100	3,464
Pakistani	89.9	10.1	92.1	7.9	95.5	4.5	100	13,324
White British	90.0	10.0	91.4	8.6	93.7	6.3	100	391,787
Bangladeshi	90.1	9.9	91.8	8.2	94.9	5.1	100	5,874
White Irish	90.2	9.8	92.5	7.5	94.6	5.4	100	1,523
Chinese	90.4	9.6	90.6	9.4	96.2	3.8	100	1,276
Indian	91.3	8.7	92.1	7.9	95.7	4.3	100	10,117

Table 6: LSOA Moves by ethnic group during the first year of school, the transition between primary and secondary and at the start of the GCSE period.

Table 7 shows the number of LSOA moves against the number of years a pupil has been eligible for FSM, across the educational life course. It is expected that there may be an association between home moves and those from lower socio-economic backgrounds. Understanding moves in relation to the socio-economic context of households help understand the potential negative impacts of moving. Table 7 shows that almost 78% of those who have never moved have never been eligible for FSM. Almost 72% of those who have moved 5 or more times have been eligible for FSM at some point during the educational life course. In 2007, it was estimated that, in England, 334,000 pupils eligible for FSM were not registered (Sahota et al., 2013), so it is likely that the numbers are somewhat understated.

The number of pupils eligible for FSM in the cohort remains fairly constant over the educational life course. In school years 2002/03, 2003/04 and 2004/05 the average number eligible is 82,000; for the remaining school years the average number eligible for FSM is 72,000, this suggests that more pupils are eligible for FSM in the early years of schooling compared with the latter. A joint study carried out by the Child Poverty Action Group and the British Youth Council found that when it came to FSM, young people were concerned about confidentiality and wanted to access their lunch without the embarrassment of peers knowing that they were in receipt of FSM. Schools across the country have different ways of accounting for FSM, some use vouchers, or an electronic card system; others use a register, which means they can be identified among classmates (Farthing, 2012). The study highlighted that secondary school pupils especially raised this as a concern and would prefer a more anonymous system to reduce stigma (Farthing, 2012). This could, therefore, be a reason for lower numbers of registered FSM pupils in the later school years.

Table 8 shows the percentage of each ethnic group eligible for FSM over the educational life course. Almost 80% of Chinese pupils were never eligible for FSM during the educational life course. This is closely followed by 76% of Indian pupils, 74% of White Irish pupils and just over 73% of White British pupils. On the other hand, only 25% of Gypsy and Traveller pupils, 35% of Bangladeshi pupils and 38% of Black African pupils were never eligible for FSM over the educational life course. Conversely, 20% of Gypsy/Traveller pupils were eligible for FSM every school year, followed by 15% of Black African pupils and 14% of Bangladeshi pupils. Only 2.4% of Chinese pupils were eligible for FSM every school year, followed by 3% of Indian pupils and just over 3% of White British pupils. This indicates that there are socio-economic differences between ethnic groups.

	No. of Years eligible for FSM							
No. of LSOA moves	0	1	2 - 4	5 - 7	8 - 10	11	%	Total
0	77.6	3.3	6.4	4.6	4.4	3.7	100	256,626
1	68.6	4.6	9.5	6.6	6.3	4.2	100	124,050
2	56.8	6.0	13.2	9.7	9.1	5.1	100	54,034
3	46.5	7.2	16.7	12.4	11.7	5.6	100	24,354
4	38.6	7.9	18.7	15.2	13.9	5.6	100	10,199
5+	28.4	7.9	22.0	17.9	17.7	6.1	100	6,303

Table 7: LSOA Moves by FSM eligibility over the educational life course

	No. of years eligible for FSM							
Ethnic Group	0	1	2 - 4	5 - 7	8-10	11	(%)	Total
Gypsy/Traveller	24.7	3	10.1	15.5	25.8	20.8	100	353
Bangladeshi	34.4	7	16.2	12.3	16.2	13.9	100	5174
Black African	38.3	4.7	11.4	11.5	19.1	14.9	100	7795
Black Other	41.5	6.1	13.9	13.6	15.9	9.1	100	1850
Black Caribbean	47.6	6.4	15.6	12	12	6.3	100	6461
Mixed White Black Caribbean	47.9	5.5	14.2	11.8	12.4	8.4	100	6335
Pakistani	48.4	6.7	13.7	10.4	11	9.9	100	13324
Other	52.3	4.6	11.5	10.5	11.6	9.7	100	6862
Mixed White Black African	53.7	4.8	11.8	10.7	12.5	6.4	100	1673
Mixed Other	57.3	5	11.5	10.2	10	6.1	100	5234
White Other	60.9	4	9.9	8.8	9.7	6.7	100	8483
Asian Other	61.3	6.4	12.5	7.7	7.5	4.6	100	3155
Mixed White Asian	66.3	4.2	9.8	7.4	7.3	5	100	3464
White British	73.3	4.1	8.4	5.8	5.2	3.3	100	391787
White Irish	74.1	3.8	6.9	5	5.2	4.9	100	1523
Indian	76	4.9	7.6	4.6	3.8	3	100	10117
Chinese	79.5	3.5	5.9	4.1	4.5	2.4	100	1276

Table 8: FSM eligibility by Ethnic Group (%)

4.5 LSOA moves by geography

Figure 9 reports the LAs in England with the highest proportion of LSOA moves across the educational life course. On average 12% of the NPD cohort living in Blackpool, Thanet and Hastings moved LSOA each school year. During the early primary school years between 2002 and 2007, 15% of the cohort living in Blackpool moved each year. The LAs listed in Figure 9 are geographically spread across England, all, however, share a similarity in that they are ranked highly in terms of deprivation: all fall within the top 20% most deprived LAs in the country. The 2010 IMD index ranks Blackpool as the most deprived of 326 Local Authority areas in England and Burnley as 4th most deprived, based on both the average LSOA score and concentration of deprivation measures.

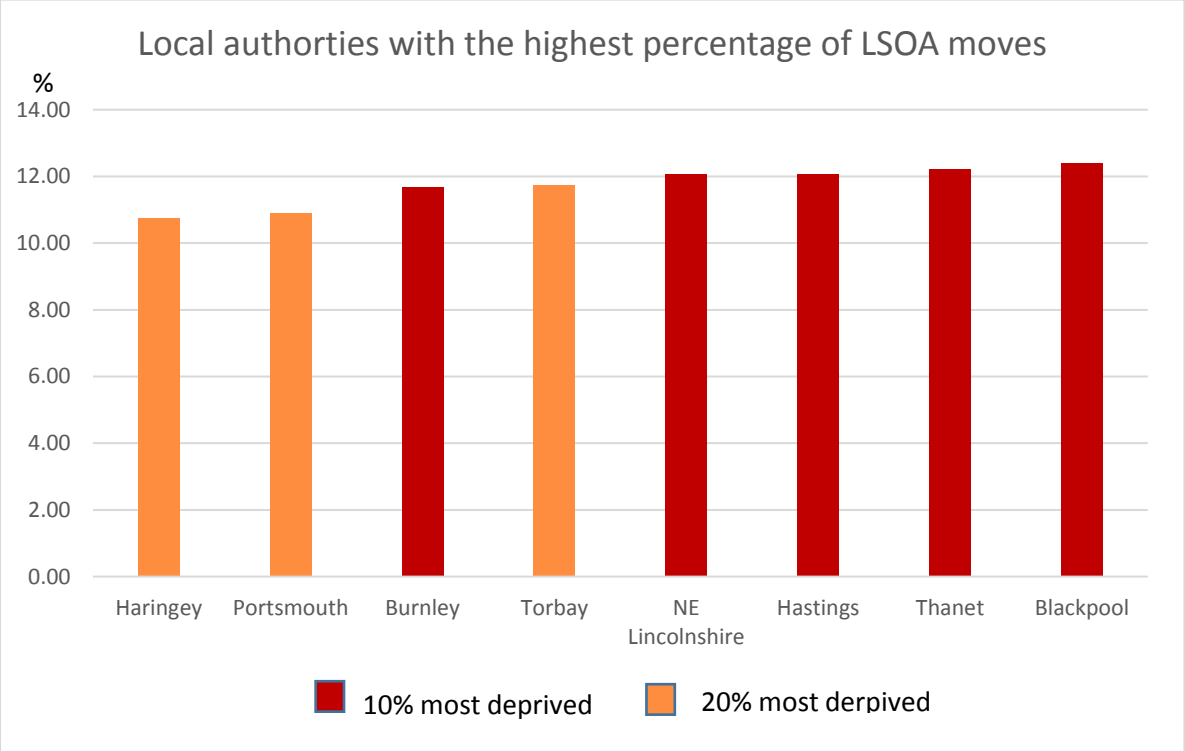

Figure 9: LAs with the highest percentage of LSOA moves categorised by IMD deprivation deciles

Conversely Figure 10 shows the LAs in England with the lowest proportion of LSOA moves across the educational life course. On average less than 5% of the NPD cohort living in West Oxfordshire moved during the educational life course. Other than the City of London, which has a small residential base, all LAs in Figure 10 are in fairly rural, low-density areas. Figure 10 also highlights by colour the IMD rank for the Local Authorities. All LAs fall within the 20% least deprived LSOAs in England, other than Craven which falls within the 30% least deprived LAs. Harborough in Leicestershire and South Northamptonshire fall within the top 1% least deprived LAs in England.

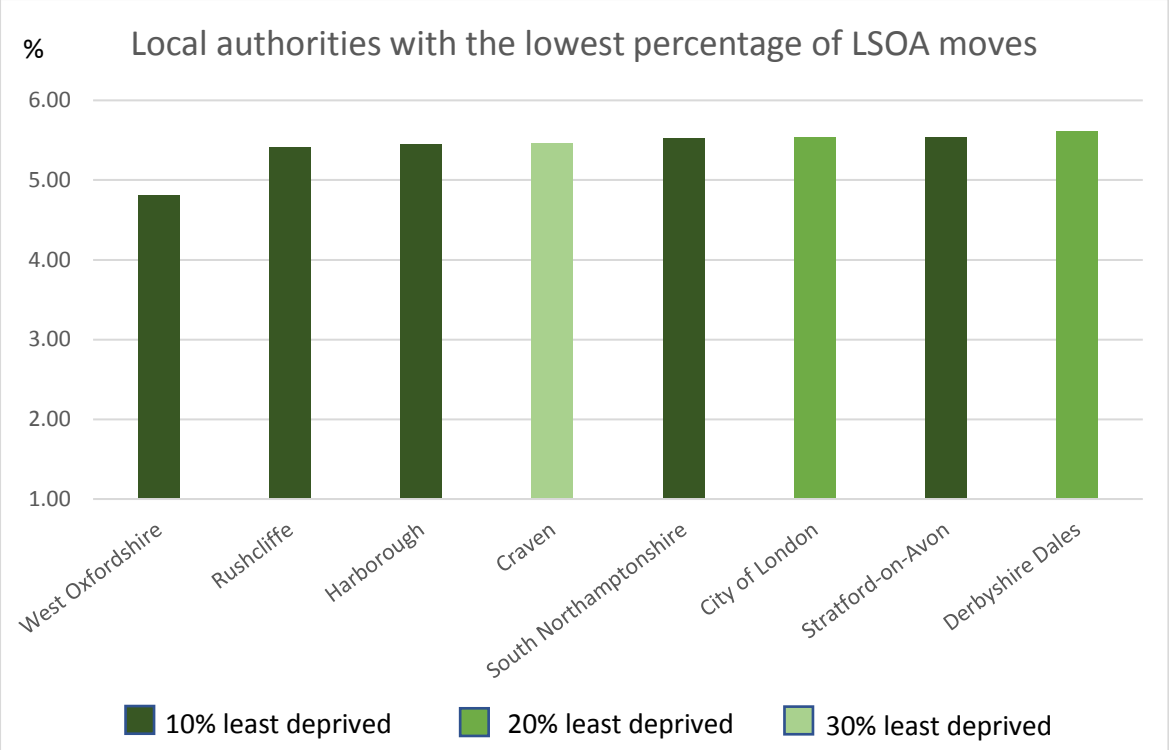

Figure 10: LAs with the lowest percentage of LSOA moves categorised by IMD deprivation deciles

Both figure 9 and 10 show differences in number of moves by place, however differences in residential mobility patterns are not so much about where these places are geographically, but more about the type of places these are, showing a difference in social geography. Figure 9 suggests that increased mobility tends to be in more deprived urban areas whereas figure 10 suggests that reduced mobility tends to be in less deprived rural areas.

Tables 5 to 8 have outlined the percentage of ethnic groups who move across the educational life cycle and how moving LSOA is related to FSM eligibility. Table 5 showed that Black African pupils appear to move the most, with Indian pupils moving the least. All pupils move more during the beginning of the educational life course and move least at the end of the educational life course. There also appears to be differences in terms of where and to what types of places, with more moves taking place in more deprived urban areas such as Blackpool and fewer moves taking place in lower, deprived rural areas such as West Oxfordshire. To test these initial results in a more robust way and to assess the significance, ethnicity and FSM will be evaluated against moves in three level logit multilevel model. The three levels are the ten time points across the educational life course nested within each of the pupils within the NPD cohort who are nested within the 326 LAs across England, so school year within pupil, within geography.

4.6 The odds of moving LSOA

The model is set out as a three-level model to analyse the effect of ethnicity, FSM eligibility and the school year on moving LSOA while portioning variance into the occasion (level 1), the individual (level 2) and the LA in which a pupil lives (level 3). The model equation is as follows:

$$log\left(\frac{y_{ijk}}{1-y_{ijk}}\right) = \beta_0 + \beta_1 x1_{ijk} + \beta_2 x2_{jk} + u_{jk} + u_k$$

$$u_{jk} \sim N(0, \sigma_u^2)$$

$$u_k \sim N(0, \sigma_u^2)$$

Where the response y_{ijk} is the likelihood of a residential move in period i for individual j in Local Authority k. β_0 is the overall intercept in log odds for moving house when all else is constrained to zero. β_1 represents a one-unit change in a time-varying covariate $x1$ in occasion i of individual j in Local Authority k. β_2 represents a one-unit change in a time-invariant covariate $x2$ of individual j in Local Authority k. A normally distributed random effect is included at levels 2 (u_{jk}) and 3 (u_k) to control for unobserved time-invariant characteristics that influence mobility throughout the study period.

Results are transformed from Log Odds into Odds Ratios for ease of interpretation. Table 9 shows that Pakistani, Bangladeshi and Indian pupils have lower odds of moving than White British pupils. Black African pupils are most likely to move with an odds ratio of 1.64. Black Caribbean, White Other, Gypsy/Traveller and Chinese pupils have greater odds of moving than White British pupils. The odds ratio of moving for pupils eligible for FSM are 2.52 time higher than pupils who have never been eligible for FSM. The odds ratio of moving home is more than 0.5 lower at the end than at the start of the educational life course. Overall, the odds ratio of moving decrease annually, however, there is an increase between 2006 and 2007 when as previously highlighted, pupils are likely to be moving to be closer to their preferred secondary school.

LSOA moves	Odds Ratio	Std. Err.	P-value	95% Conf. Interval	
Reference: White British					
Pakistani	0.80	0.01	<0.01	0.77	0.83
Bangladeshi	0.90	0.02	<0.01	0.86	0.95
Indian	0.93	0.02	<0.01	0.89	0.97
Chinese	1.11	0.06	0.04	1.01	1.23
Mixed	1.21	0.02	<0.01	1.18	1.24
Traveller/Gypsy	1.25	0.10	0.01	1.06	1.46
White Other	1.27	0.02	<0.01	1.22	1.31
Other	1.33	0.02	<0.01	1.29	1.37
Black Caribbean	1.46	0.03	<0.01	1.40	1.53
Black African	1.64	0.03	<0.01	1.58	1.70
Reference: No FSM					
FSM	2.52	0.01	<0.01	2.49	2.54
Reference: 03_04					
LSOA move 04_05	0.97	0.01	<0.01	0.96	0.99
LSOA move 05_06	0.74	0.01	<0.01	0.73	0.76
LSOA move 06_07	0.83	0.01	<0.01	0.81	0.84
LSOA move 07_08	0.77	0.01	<0.01	0.76	0.79
LSOA move 08_09	0.76	0.01	<0.01	0.75	0.77
LSOA move 09_10	0.53	0.00	<0.01	0.52	0.54
LSOA move 10_11	0.50	0.00	<0.01	0.49	0.51
LSOA move 11_12	0.47	0.00	<0.01	0.47	0.48
LSOA move 12_13	0.44	0.00	<0.01	0.43	0.44
cons	0.07	0.00	<0.01	0.06	0.07

Random-effects Parameters	Estimate	Std. Err.	95% Conf. Interval	
Level 3: Local Authority				
var(cons)	0.05	0.00	0.04	0.05
Level 2: Pupil				
var(cons)	1.09	0.01	1.08	1.11

Table 9: Three Level Logit Binomial Multilevel Model output (LSOA moves)

Figure 11 shows the predicted probability of moving LSOA each school year across the educational life course. The graph highlights that the probability of moving is greatest at the beginning of the educational life course, during the first three years of primary school. By year 4 this decreases by .02 and then increases again in year 5 when as previously highlighted, many families move to a specific area for secondary school. The probability of moving from year 7 (when pupils start secondary school) onwards decreases considerably. The probability of moving is lowest in year 11 when pupils are taking their GCSE exams.

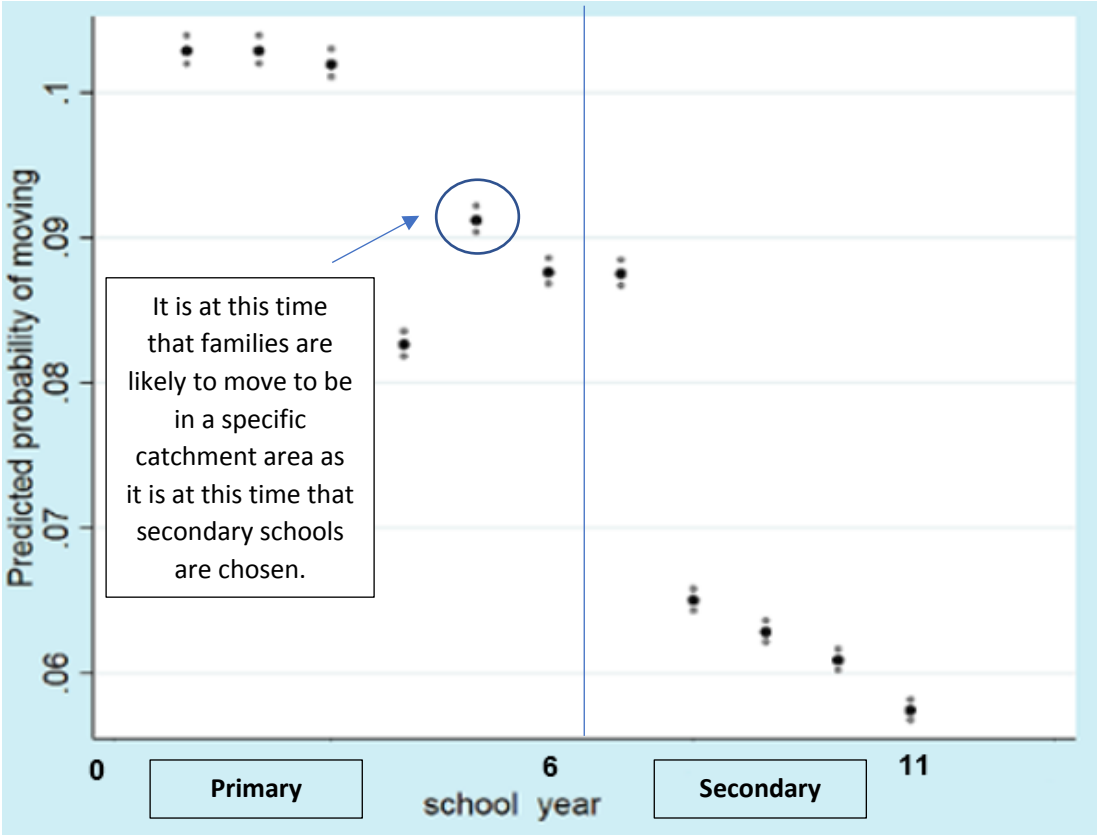

Figure 11: Predicted probability of moving across the educational life course

The random effects parameters indicate how much of the variance can be explained by the three levels. The variance partition coefficients (VPC) are as follows:

Level 1: Occasion: 3.29 / (0.05 + 1.09 + 3.29) = 0.743

Level 2: Person: 1.09 / (0.05 + 1.09 + 3.29) = 0.246

Level 3: LA: 0.05 / (0.05 + 1.09 + 3.29) = 0.011

The occasion level, the school year in which pupils move LSOA has a VPC of 0.743 meaning that time is the most important factor when it comes to moving, with occasion accounting for almost 74% of the variance. The person-level VPC is 0.246 which means 25% of the variance can be accounted for at the individual level, meaning that moves vary based on the individual. Only 1% of the variance can be accounted for by Local Authority, meaning that geography does not have any major influence on the frequency of moves.

Although there is little variation at the LA level, there is variation between the individual LAs, shown in Figure 12. The caterpillar plot lists the 326 LAs in England. Values above zero indicate a higher than

average number of moves for a specific LA and values below zero indicate a lower number of moves than average. The LA with the largest residual is Blackpool, which as previously highlighted is the most deprived LA according to the IMD in 2010. The LAs with the lowest residuals are all in within London. The capital has a well-connected transport system meaning a change in school or job will not necessarily trigger a home move as public transport can be easily accessed across Greater London. In an expensive and tight housing market, many families are unable to move even if they have the desire to do so in London (Clark & Huang, 2003).

There are two LAs which have large confidence intervals. Both have a very small population which results in this imprecision: one is the Isles of Scilly which has on average 18 of the NPD cohort pupils living there each school year, the other is the City of London which has on average 19 of the NPD cohort pupils living there each school year.

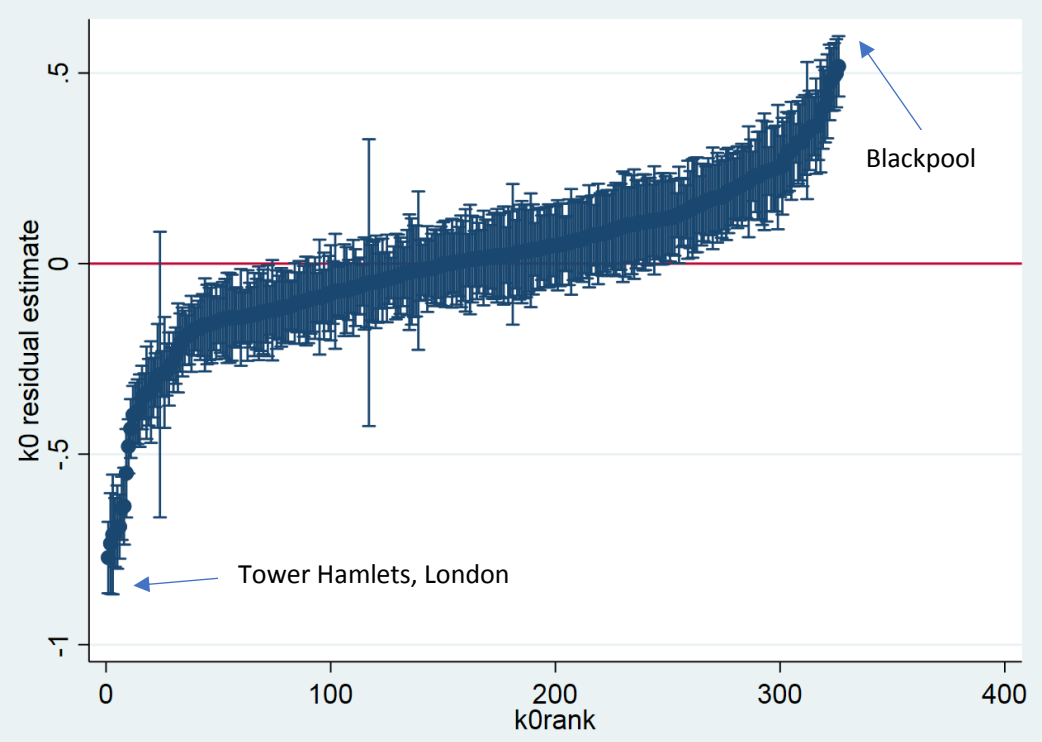

Figure 12: The residual estimates for each of the 326 LAs across England

4.7 A big dataset tells small stories 1: Bangladeshi case study – Tower Hamlets

The caterpillar plot highlighted that Tower Hamlets is the LA with the lowest residuals and therefore has the lowest number of predicted moves out of the LA. When analysing the residential moves made

by Bangladeshi pupils in Tower Hamlets, over 50% take place within the same LA. Therefore, the majority of moves are contained within the same area rather than out of the Local Authority. Tower Hamlets is therefore a good case study in which to analyse moving patterns to enable a better understanding of local residential mobility. Evaluating the residential mobility patterns of a specific ethnic group within a specific Local Authority means that each individual LSOA move made by a pupil can be analysed. The similarities and differences in residential mobility can be also be highlighted which would not be possible to do when analysing the entire NPD cohort.

Almost a quarter of all Bangladeshi pupils within the NPD cohort lived in Tower Hamlets at the start of schooling; this therefore is the reasoning for evaluating Bangladeshi pupils moves in more detail within the LA. Tower Hamlets is a borough in the East End of London, which is highlighted by a red boundary on the map shown in Figure 13. The borough has a population of 272,890 (Tower Hamlets Council, 2013) and has one of the largest ethnic minority populations in the country.

Figure 13: Map showing location of Tower Hamlets within Central London

Within the NPD, there are 5,874 Bangladeshi pupils, of which 1,351 lived in Tower Hamlets during their first year of school. Of the 1,351 pupils, 709 moved one or more times during the educational life cycle; 474 moved within Tower Hamlets, 193 moved to a neighbouring Local Authority, such as Newham or Barking, 42 moved to elsewhere in England outside of Greater London. Figure 14 shows the moves made between LSOAs by Bangladeshi pupils living in Tower Hamlets to an LA within Greater London. This accounts for 30% of total moves from Tower Hamlets over the educational life cycle. Of the 193 pupils that move from Tower Hamlets to another LA in Greater London, 70 move to Redbridge, 55 move to Barking & Dagenham and 44 move to Newham. These 3 LAs have a similar ethnic and social profile to that of Tower Hamlets. All 4 LAs have a minority White British population, with White British making up less than 50% of the overall population in each of the 4 LAs. Newham and Tower Hamlets have very similar tenure profiles with 72% and 64% respectively living in social housing or private rentals. In Tower Hamlets 40% live in social housing, and 24% are in privately rented accommodation, in Newham, 32% are in social housing, and 39% are in privately rented accommodation. There is a higher percentage of owner-occupied in Redbridge and Barking with only 35% and 51% respectively living in private rental and social housing.

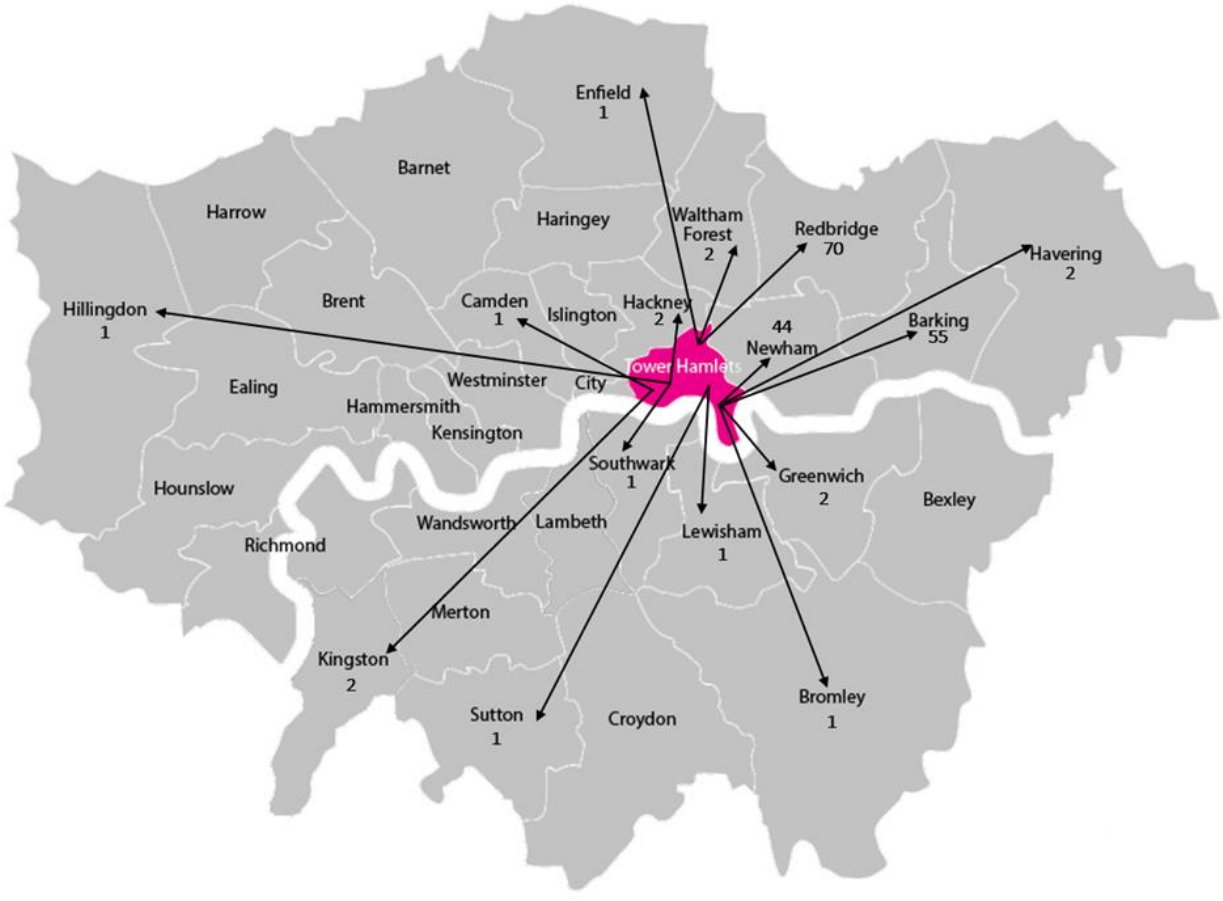

Figure 14: Moves from Tower Hamlets to LAs within Greater London (Bangladeshi pupils within NPD cohort) over the educational life course (2002-13).

Of the moves made by Bangladeshi pupils living in Tower Hamlets, 90% are either within the same Local Authority or to Local Authority with similar ethnic and social profiles (Newham, Barking and Redbridge). It would be interesting to evaluate whether moves made by Bangladeshi pupils in Newham, Barking and Redbridge follow a similar pattern to that of Tower Hamlets. In order to analyse this, a chord diagram was created to show the moves made by Bangladeshi pupils between the 4 Local Authorities (Tower Hamlets, Redbridge, Barking and Newham) and to all other LAs, as shown in figure 15. The numbers have all been square rooted to stop the diagram being dominated by larger numbers.

The chord diagram shows the moves made between the four main LA's (Tower Hamlets, Newham, Redbridge and Barking) and to all other LAs. The colours shown in the key represent each LA and the colours show the movement of people between each LA. For example, the yellow line from Tower Hamlets to Newham shows the square-rooted number of people that moved from Tower Hamlets to Newham. The majority of moves made by Bangladeshi pupils in Tower Hamlets are within the same LA (as highlighted in yellow), this is also true of Newham (in green), Redbridge (in Pink) and Barking (in red) with the majority of moves taking place within the same LA. Like Tower Hamlets, once accounting for the moves within Newham, the remaining movers living in Newham either move to Redbridge, Barking or Tower Hamlets, with a small number moving to other LAs. Both Tower Hamlets and Newham have almost identical moving patterns and are the most alike in terms of ethnic, social and tenure profiles.

Only a small number of Bangladeshi pupils move in Barking, but those that do, move in a similar pattern to Bangladeshi pupils in Newham and Tower Hamlets. Although 70 Bangladeshi pupils move to Redbridge from Tower Hamlets, no Bangladeshi pupils living in Redbridge move to Tower Hamlets. Redbridge in terms of the overall proportion of tenure has double the amount owner-occupied dwellings than in Tower Hamlets, perhaps making moves less desirable if there is limited housing available to buy. The average house price in Tower Hamlets is also £32,500 more than in Redbridge (£451, 050 compared to £418,590) as of 2018 (HM Land Registry, 2018). Although a small number of Bangladeshi pupils do move to Newham from Redbridge which has similar tenure to Tower Hamlets, however, average house prices in Newham are £51,500 less than in Redbridge (£367,175 compared to £418,590) (HM Land Registry, 2018).

Due to the differences in tenure between Redbridge and Tower Hamlets, a move from Tower Hamlets may signal a move out of private/social rental into owner-occupied, linking back to Rossi (1955) seminal study concluding that people "moving to improve'. This is merely speculative, however, and will be focused on in more detail in the next chapter, where LSOA moves will be evaluated on their ethnic and social profiles, using the Index of Multiple deprivation to analyse if a pupil has moved to a more or less deprived neighbourhood, to take the analysis a step further.

To summarise, the chord diagram shows that Bangladeshi pupils in Tower Hamlets especially, move, but do not move far. They are not 'stuck in place' exactly, but there is a stickiness to the type of neighbourhoods they move between.

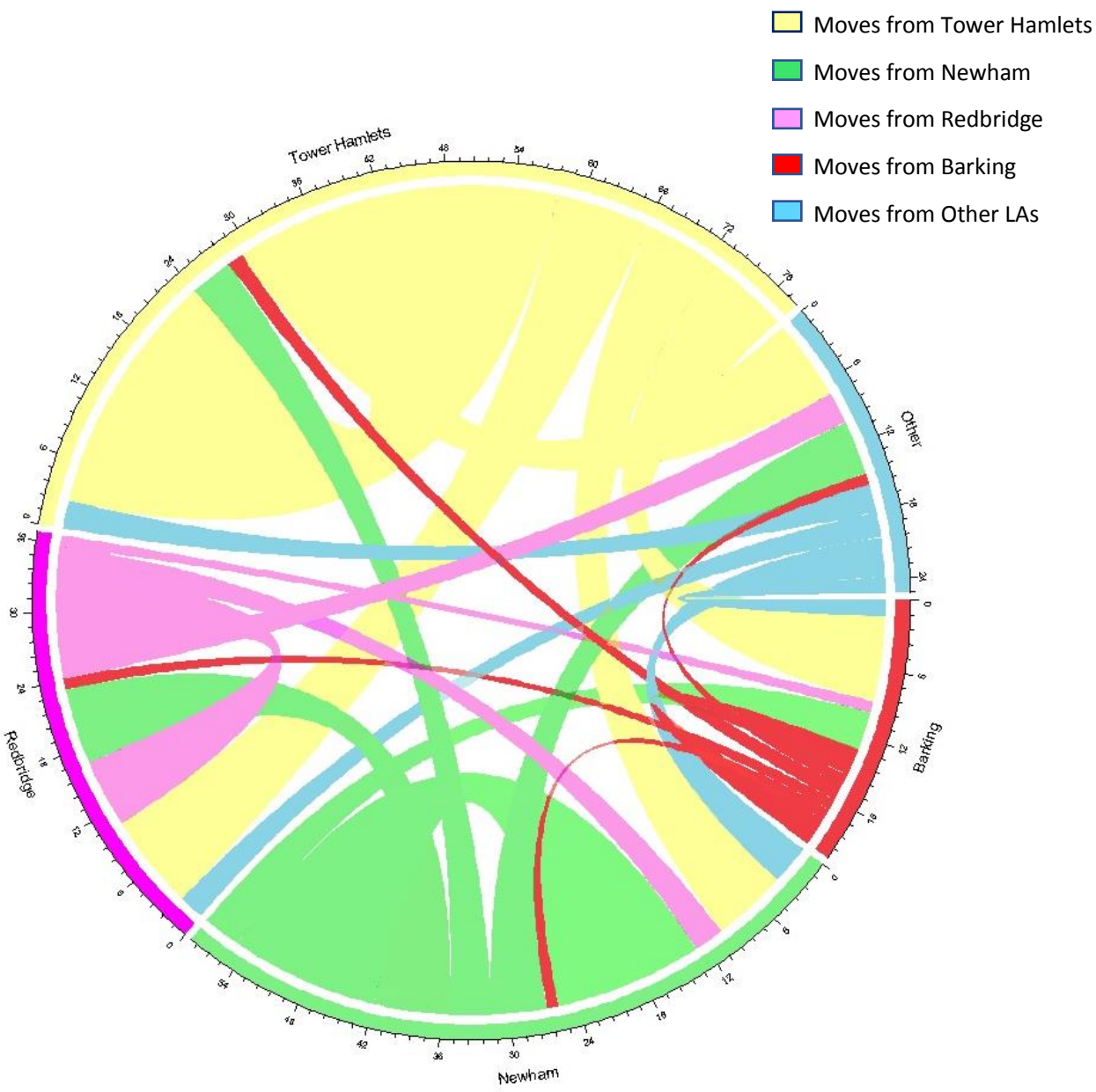

Figure 15: Chord Diagram showing LSOA moves between Tower Hamlets, Newham, Redbridge, Barking and Other LAs across the educational life course (2002-13).

It is not possible to know from the NPD data why families choose to move; however, it is possible to draw on literature as to why Bangladeshi pupils may move during the educational life course. Tower Hamlets has a relatively large percentage of both private, and socially rented housing and a low proportion of owner-occupied housing: 40 per cent of households are social rented compared with 18 per cent nationally. Over 33 per cent of Tower Hamlet's households are privately rented, almost twice of that nationally. The remainder of the population is in owner-occupied households, which is one of the lowest percentages in England (27% vs 64% nationally) (Tower Hamlets Council, 2015). Between 2001 and 2011, the most significant change in Tower Hamlet's tenure profile has been the large increase in the number of privately rented households: these households have more than doubled in number (Tower Hamlets Council, 2015).

Privately rented housing can be very unstable with fixed-term tenancies often lasting only six or twelve months, with no guarantee they will be extended (Lancaster and McCarthy, 2014). The cost of rent has also been rising year on year. On average, there has been a 20% increase in private rentals in Tower Hamlets, which equates to an increase of £304 a month in an 18-month period for an average 2-bedroom property, with the total cost now exceeding £1750 a month (Lancaster and McCarthy, 2014). This may, therefore, cause families to have to move to cheaper accommodation if they are unable to afford rent increases. The quality of housing within the private rented sector can also be substandard. A survey carried out by Shelter in 2012, found that over a quarter of landlords and letting agencies in London had not addressed any of the substandard conditions in their properties and repairs were left outstanding for months. Almost a third of those renting in London experienced damp in their homes (Lancaster and McCarthy, 2014). Many cannot complain to their landlord for fear of being evicted and therefore withstand poor quality living environments.

Bangladeshis are relatively recent arrivals to the UK and therefore tend to be more concentrated in private and social housing (Dench et al, 2006). Bangladeshis are generally concentrated in the worst neighbourhoods in Tower Hamlets, often living on unpopular estates or in poor quality flats and homes (Butler and Hamnett, 2011). Phillips (1988) found that Bangladeshis were allocated poor quality housing on the least desirable estates in Tower Hamlets. It has been stated that this was due to the issue of demand and availability, with the housing allocated being all that was available at the time. However, it has also been suggested that concentrating Bangladeshis in specific neighbourhoods was as a result of discrimination or prejudice against them (Butler and Hamnett, 2011). South and Crowder (1998) found in the US that ethnic minorities often find it difficult to improve their quality of housing due to discrimination within the housing market.

It is well documented that problems of overcrowding are faced by large Bangladeshi families (Friedman, 2010). Friedman et al (2010) find that a shortage of available larger homes means that

overcrowding is becoming more common, this can be very disruptive for children, especially if they are sharing a room with siblings as it means they have no private space. Lack of space means it can be difficult to complete homework and sharing a room means that children will often go to bed at different times which can lead to disturbed sleep which can then have a negative impact on learning and performance at school. Friedman et al (2010) find strong associations between poor housing and lower educational attainment.

Some ethnic minorities may be deterred from moving to a majority concentrated neighbourhood due to a fear of prejudice or discrimination (Phillips et al. 2007). This may be a reason for Bangladeshi pupils moving within the same local authority or neighbouring local authorities of Tower Hamlets as they feel less of a minority within these neighbourhoods. A good social network within a neighbourhood, however, may also prevent ethnic minorities from moving. Families may share childcare responsibilities and socialising locally also saves on transportation and recreation costs which are especially high in London (Boschman et al., 2014; Dawkins 2006: DeVanzo 1981). It is often very difficult to develop or maintain this type of social capital after moving house, especially for ethnic minorities and families of lower socio-economic status (Boschman et al., 2014; DaVanzo 1981). This narrative is likely to apply to many ethnic groups, not just Bangladeshis and may explain why the majority of moves are within Tower Hamlets or to a neighbouring LA with a similar social and ethnic profile.

4.8 Conclusion

Using both descriptive statistics and statistical analyses, this chapter has contributed to the literature by highlighting that certain ethnic groups have a greater propensity to move than others, with over two-thirds of Black African pupils moving one or more times over the educational life course compared with only 40% of Indian pupils. One of the main possible reasons for this could be that Indians have the highest proportion of owner-occupied housing, compared with Black Africans who rely much more heavily on social housing and private rentals. Privately rented housing can be very unstable with short fixed term tenancies that are not guaranteed to be extended (Lancaster and McCarthy, 2014). Privately rented housing can also be substandard, forcing families to move due to health and safety reasons. Rents have also risen steeply alongside the increased demand. This may, therefore, cause families to have to move to cheaper accommodation if they are unable to afford rent increases.

The occasion during the educational life course at which a pupil moves has been found to have the greatest influence on moving, with 75% of the variance in the model being explained by time, with more moves taking place at the beginning of the educational life course, with the number of moves

decreasing by over half by the final year of schooling. The analyses and multilevel model show that there is an association with FSM eligibility and residential mobility, with the odds of those eligible for FSM being two and a half times higher than those who have never been eligible, suggesting that those from lower socio-economic backgrounds move more often. The model also shows that there are geographical differences with a lower number of moves taking place in London. However, the case study of Tower Hamlets finds that the majority of moves made by Bangladeshi are made within the same Local Authority.

By analysing the moving patterns of Bangladeshi pupils in Tower Hamlets it showed that 90% of moves take place within the same LA or to a neighbouring LA with a similar tenure and social profile. This could suggest that discrimination or hostility is preventing ethnic groups from moving to neighbourhoods or because they do not want to leave their communities, choosing to move to areas with similar concentrations of their ethnic group. As highlighted, Indian pupils move the least, many Indians are now 3rd or 4th generation and have better labour market outcomes and socio-economic attainment than Bangladeshis who are more likely to experience long-term unemployment, are under-represented within professional and managerial positions (Platt, 2005). Many Indian families have therefore been able to move from poorer ethically concentrated inner-city areas out to the suburbs (Phillips 1998). The reason for Bangladeshi pupils moving to similar areas may also be purely due to socio-economic reasons. As highlighted previously, higher house prices and cost of rent in London means it is difficult to move out of certain types of neighbourhoods without the financial means to do so, and therefore many are confined to moving within the same Local Authority. Families may also be confined to certain areas for employment reasons, as they may need to live near their place of work.

The results of this chapter suggest that in inner-city areas such as London, Bangladeshi pupils most specifically are likely to move to the same type of area or neighbourhood in terms of tenure and socio-economic status. The next chapter will take the analysis one step further, not just analysing who moves and where they move but whether pupils move to a better or worse neighbourhood in terms of deprivation.

Chapter 5: Moving for better or for worse?

5.1 Introduction

There is contrasting literature on why people move as discussed in chapter 2. The seminal research by Rossi in 1955, and subsequently built on by many authors (Bird, 1976; Clark and Onaka, 1983; Lee et al., 1994; Gasper et al., 2010) over the last fifty years, states that people move as part of status attainment and upward socio-economic improvements. However more recent research (Desmond, 2015; Coulton et al, 2012) and policy papers such as "State of the Nation" (SMCP, 2015) suggest that people can also move, not to better their circumstances but due to negative socio-economic reasons, such as unstable housing, financial difficulty and domestic issues. The previous chapter found that the odds of moving were greater for those who were eligible for FSM and that Blackpool has the highest percentage of moves each year and was ranked as the most deprived LA in the country in 2015. The aim of this chapter is to develop the analysis of LSOA moves one step further, not only recording the move but focusing on the origin and destination and to test some of the hypotheses in the existing literature to address the second research question "How are socio-economic status, ethnicity and geography associated with type of neighbourhood move and distance moved?"

The Index of Multiple Deprivation (IMD) will be used as a marker of neighbourhood wealth to analyse which NPD pupils move to more deprived or less deprived neighbourhoods, and later in chapter 7 this will be linked to educational attainment to evaluate the association that moving to a better or worse neighbourhood has on GCSE results. Free School Meal (FSM) eligibility will also be used as a marker of individual socioeconomic status. Cooke (2010) states that residential mobility, especially among people of lower socio-economic status, generally involves shorter distances and relocation to neighbourhoods that are similar in terms of the level of deprivation to their former neighbourhood (Cooke, 2010). To test this hypothesis, this chapter as well as analysing the IMD score for neighbourhoods will also calculate the distance travelled to evaluate whether there are any patterns among social and ethnic groups when it comes to distance moved.

Chapter 4 highlighted that ethnic groups have different propensities to move with Black African pupils moving the most on average and Indian pupils moving the least on average. Finney & Simpson (2009) find while studying data from the 2001 census that non-White groups in general move shorter distances than White groups, and these findings will also be tested.

Finally, this chapter includes a case study focusing on Greater London, to analyse the moving patterns between types of neighbourhoods at a smaller geographic scale. The analysis will focus on distance moved in miles decomposed by ethnic group and socio-economic status and will also analyse the

ethnic composition of origin and destination neighbourhoods to explore whether ethnic groups move to areas that have a similar ethnic profile to the neighbourhood they have moved from. The case study in the previous chapter found that Bangladeshi pupils moved to areas with a similar ethnic profile, which may be to do with housing availability and wanting to stay near to social networks, or may, on the other hand, be due to discrimination and hostility in other neighbourhoods. This hypothesis will be analysed further focusing on NPD pupils living in Greater London.

5.2 Evaluating moves by neighbourhood deprivation

Residential mobility is a complex process in which individuals or families may be repositioned in the residential hierarchy (Clark and Dieleman, 1996). With this in mind, it is important to consider if those pupils that are moving are upgrading or downgrading from their previous neighbourhood. The 2010 IMD scores were matched to each LSOA and then grouped into deciles for each of the school years so they could be easily comparable across the educational life cycle, 10 being most deprived and 1 being least deprived. Moving to a less deprived neighbourhood is referred to as 'trading up' and moving to a more deprived neighbourhood will be referred to as 'trading down'. Table 10 is a matrix depicting the IMD decile group score change between 2002 (the first year of schooling), and 2013 (the final year of compulsory schooling). This includes only those pupils who have moved LSOA during the educational life course and therefore accounts for 46% of the NPD cohort.

Almost 40% of pupils living in one of the least deprived neighbourhoods in 2002 at the start of school were living in the same type of neighbourhood at the end of school in 2013 having moved one or more times. Just over 38% of those who lived in the most deprived neighbourhood in 2002 at the start of school, finished school living in an equally deprived type of neighbourhood, even after moving one or more times. Just under 1% (which represents just over 300 pupils) move from one of the most deprived neighbourhoods to one of the least deprived neighbourhoods across the educational life course. Approximately 0.5% of pupils (75 pupils) living in one of the least deprived neighbourhoods move to one of the most deprived neighbourhoods across the educational life course. Table 10 shows that the majority of pupils remain in a similar type of neighbourhood when moving showing that the type of place even for the mobile remains relatively static.

IMD Group	(2013)										
(2002)	Low 1	2	3	4	5	6	7	8	9	High 10	Total
1	39.7	18.2	13.1	9.6	7.2	5.4	3.4	1.8	1.1	0.5	15,579
2	21.5	23.4	14.9	11.5	9.6	7.1	4.9	3.7	2.3	1.1	15,951
3	14.8	15.5	20.7	12.2	11.1	9.0	6.8	5.1	3.3	1.6	16,797
4	11.1	13.5	13.3	19.1	11.8	10.4	8.2	6.2	4.1	2.2	16,686
5	8.9	11.1	11.7	12.2	18.2	11.7	9.6	8.1	5.3	3.1	18,388
6	6.6	9.2	9.6	10.6	11.8	17.6	12.1	10.3	7.5	4.6	20,694
7	5.3	7.1	8.2	9.3	10.6	12.4	18.7	11.7	10.0	6.8	23,136
8	3.3	5.2	6.7	7.3	9.1	10.8	13.1	20.3	14.4	9.8	26,580
9	2.0	3.6	4.5	5.6	6.9	8.9	11.6	15.4	25.4	16.3	30,570
10	0.9	2.0	2.9	3.5	4.7	6.8	9.2	12.5	19.1	38.4	34,559

Table 10: IMD group change (%) between the first year of schooling (2003) and the last year of compulsory schooling (2013).

It is clear from the matrix in table 10 that pupils are more likely to move between similar types of neighbourhood than to 'trade up' (move to a less deprived neighbourhood or 'trade down' (move to a more deprived neighbourhood). The next table (11) decomposes this analysis by ethnicity and combines the IMD scores into three categories to compare the neighbourhood type in which pupils start and finish school. Neighbourhoods with an IMD score in decile 1-3 are labelled as low, as these neighbourhoods are the least deprived. Neighbourhoods with an IMD score in deciles 8-10 are labelled as high, as these neighbourhoods are the most deprived. Neighbourhoods with an IMD score in decile 4-7 are labelled as mid as these neighbourhoods have neither high nor low levels of deprivation.

Table 11 shows that almost 35% of Black African pupils in the cohort move between the most deprived neighbourhoods during the educational life course. In total, almost 64% of Black African pupils either move between or remain in one of the most deprived neighbourhoods. Just under 2% of Black African pupils live in or move between one of the least deprived neighbourhoods. This is also the same for Bangladeshi pupils, with over 40% living in the same deprived neighbourhood throughout the educational life course and over 30% moving between the most deprived neighbourhoods. Just over 2% of Bangladeshi pupils live in or move between one of the least deprived neighbourhoods.

Conversely, just under 10% of White British pupils move between one of the most deprived neighbourhoods, with 18% living in the same deprived neighbourhood throughout the educational life course. Over 19% stay in one of the least deprived neighbourhoods and do not move. Very low proportions of all ethnic groups upgrade or downgrade neighbourhoods considerably. However, 3%

of Mixed White and Black African pupils and almost 3% of Chinese pupils move from one of the most deprived neighbourhoods to one of the least deprived neighbourhoods. Just over 1% of Gypsy/Traveller pupils and Mixed White and Black African pupils move from one of the least deprived neighbourhoods to one of the most deprived.

	IMD Groups							
Ethnic Group	High > high (move)	High > high (stay)	High > low (move)	Low> High (move)	Low > low (move)	Low > low (stay)	Other n'hood types	Total
Black African	34.9	28.8	2.4	0.3	0.6	1.2	31.9	7795
Bangladeshi	30.8	40.3	1.5	0.3	0.7	1.7	24.7	5874
Black Other	28.9	29.1	1.8	0.6	1.2	2.2	36.2	1850
Black Caribbean	28.0	32.4	1.4	0.2	0.6	1.6	35.7	6461
Pakistani	25.5	25.8	1.9	0.3	0.8	2.2	29.1	13324
Gypsy/Traveller	23.8	41.9	1.6	1.2	2.8	5.8	48.8	353
Mixed White & Black Caribbean	20.8	18.9	2.7	0.7	2.6	6.7	43.5	6335
Mixed White & Black African	19.7	24.2	3.0	1.2	3.6	7.9	46.4	1673
White Other	18.6	19.2	1.9	0.7	5.8	12.6	45.3	8483
Mixed Other	16.3	17.4	2.7	0.8	4.3	10.9	45.5	5234
Asian Other	15.7	20.1	3.0	0.5	2.6	6.6	53.3	3155
Indian	15.2	18.7	2.6	0.4	3.1	8.9	46.3	10117
Mixed White & Asian	12.2	26.5	2.7	0.5	6.1	17.6	45.4	3464
White Irish	11.2	16.4	2.5	0.7	5.8	15.4	47.7	1523
Chinese	11.0	15.7	2.9	0.8	6.5	18.2	45.9	1276
White British	9.8	18.2	1.9	0.8	6.9	19.0	48.2	391787

Table 11: Upgrading or downgrading neighbourhoods by ethnicity (%)

As FSM is a marker of individual socio-economic status (Gorard, 2012; Hobbs & Vignoles, 2009), it is expected that pupils who have been eligible for FSM for several years will live in some of the more deprived neighbourhoods. To test this hypothesis, table 12 lists the neighbourhood type that pupils start and finish school in by FSM eligibility. Here it is clear that almost 70% of pupils who have been eligible for FSM each school year either lived in the same deprived neighbourhood or have moved between the most deprived neighbourhoods. This is compared with only 19% of pupils who have never been eligible for FSM. Just under 2% of pupils who have been eligible for FSM every school year live

in the same affluent neighbourhoods or have moved between one of the least deprived neighbourhoods, compared with over 30% of those who have never been eligible for FSM. The percentage of pupils living in the same deprived neighbourhood or moving between the most deprived neighbourhood's increases as the number of years eligible for FSM increases.

IMD group	High> High (stay)	High> High (move)	Low> Low (stay)	Low> Low (move)	High> Low	Low> High	Other n'hood types	Total
0 years FSM	12.6	5.2	22.7	7.8	1.8	0.6	49.3	332,165
1-year FSM	20.3	15.9	6.1	4.2	2.8	1.0	49.7	20,503
2-4 years FSM	21.6	20.7	4.3	3.1	2.8	1.1	46.4	42,785
5-7 years FSM	24.1	26.2	3.0	1.9	2.3	0.9	41.5	30,917
8-10 years FSM	27.4	32.7	1.9	0.9	1.7	0.7	34.6	29,459
11 years FSM	37.5	32.2	1.5	0.4	0.9	0.4	27.1	19,737

Table 12: Upgrading or downgrading neighbourhoods by FSM eligibility (%)

5.3 Evaluating moves by distance

Table 11 and Table 12 show that there are residential mobility patterns with higher percentages of certain ethnic groups such as Bangladeshi and Black African pupils living or moving between the most deprived areas. More years being eligible for FSM also relates to a higher likelihood of living or moving between the most deprived neighbourhoods. The next step is to then test the hypothesis that those living in more deprived neighbourhoods with lower socioeconomic status are likely to move shorter distances (Cooke, 2010). To calculate the approximate distance moved, the LSOA centroid coordinates were obtained from the Office of National Statistics (ONS). These coordinates were then matched to each of the LSOAs inhabited by NPD pupils across the educational life course. When the coordinates differed the number of miles between each location was calculated, this was done using the Haversine version of "Great Circles distances formula". This is calculated as follows:

$$d = 2r\sin^{-1}\sqrt{\sin^2\left(\frac{\phi 1-\phi 2}{2}\right) + \cos(\phi 1)\cos(\phi 2)\sin^2\left(\frac{\psi 1-\psi 2}{2}\right)}$$

d is the distance between two points with longitude and latitude (ψ,ϕ) and r is the radius of the Earth.

In order to display the average distance moved by neighbourhood type, ethnic group and FSM eligibility, a series of box plots have been formulated to show the interquartile range (IQR) along with the mean distance moved. In all cases there are outliers as some pupils for example move over 100 miles or more. However, the majority move shorter distances between 0 and 30 miles as expected (Cooke, 2010). The box plots do not show the outliers (which are those values larger than Q3 by at least 1.5 times IQR) and only show the "inner fence". The mean value for each group being analysed is shown with an 'X'.

First, the distance is decomposed by neighbourhood type. Figure 16 shows the distance moved between neighbourhoods by the level of deprivation; the interquartile range is displayed as well as the mean distance moved (shown by an X) between each neighbourhood type. The graph shows that moves of the shortest distance take place between the most deprived (high>high) neighbourhoods, with an average move of 6.3 miles. For comparison, the average distance moved from one of the least deprived neighbourhoods to one of the most deprived neighbourhoods (low>high) is 19.05 miles, 16.35 miles from low>mid and 13.85 miles from high>low

Those moving between similar neighbourhood types on average tend to move shorter distances. Staying within the same neighbourhood type may be because the pupil is likely to be moving within the same city or local area, whereas a change in neighbourhood type with a further distance would suggest moving to a different city or local area. It is found that people living in rented accommodation move more on average than those in owner-occupied housing (Ball, 2010). Thomas et al. (2015) state that those typically moving the shortest distances tends to be low paid and rent from a local authority or housing association. As highlighted in chapter 4, people in more unstable housing move more, and therefore are more likely to move shorter distances as they are not moving as part of any status attainment, or life change, merely because housing has become unstable. This may well be the reason that moves of shorter distances are particularly prominent in more deprived areas.

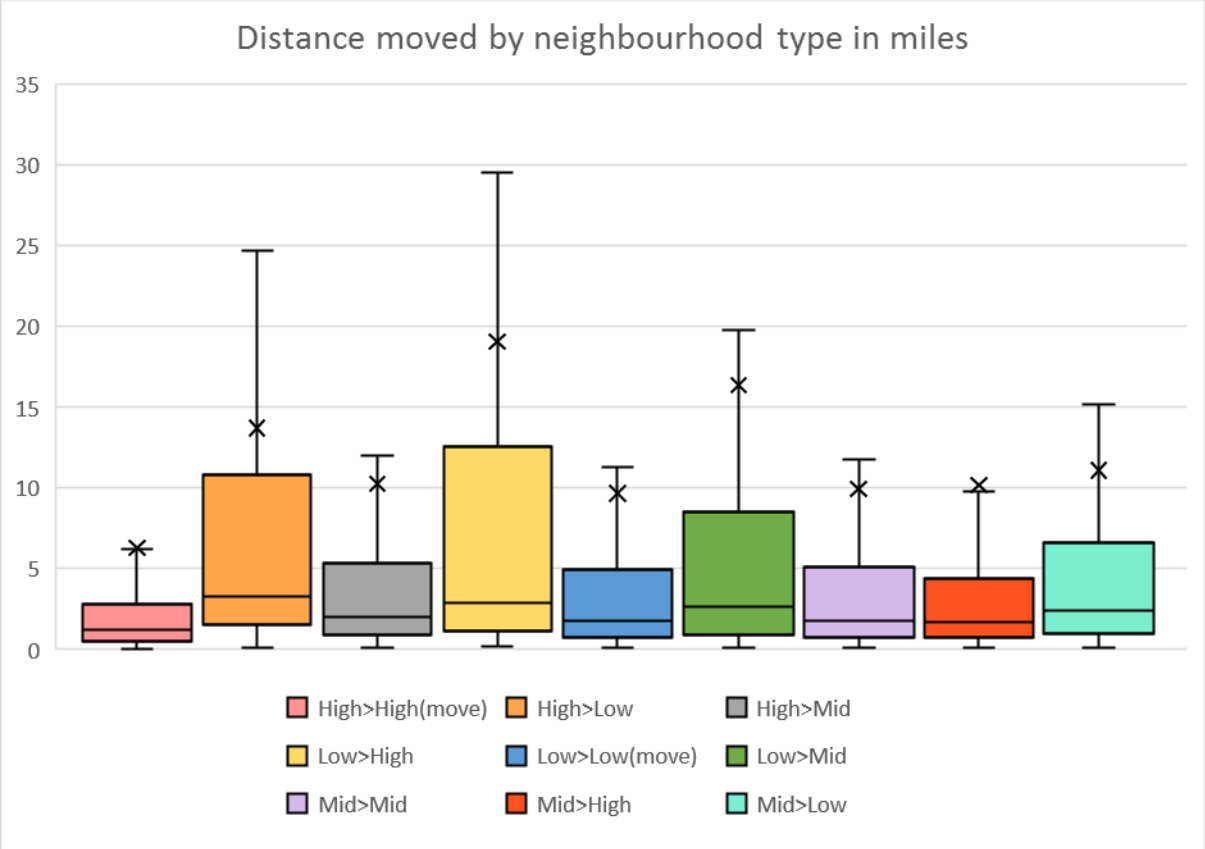

Figure 16: IQR and average distance moved in miles between neighbourhood types (IMD scores categorised as high, mid, low levels of deprivation)

To evaluate whether certain ethnic groups move greater distances than others, distance moved is decomposed by ethnic group. Figure 17 shows the average distance in miles (shown by an X) moved by each ethnic group and the interquartile range. On average Black Caribbean pupils move the shortest distance of 5.85 miles. Pakistani pupils move 6.3 miles on average and Bangladeshi pupils move 7 miles on average. Chinese pupils on average move the farthest distance, at almost 12 miles, which is over double that of Black Caribbean pupils. As detailed in chapter 2 (literature review) both Finney and Jivraj (2013) and Feijten and van Ham (2007) suggest that ethnic minority groups are likely to experience a greater sense of belonging and will want to stay relatively 'local' if moving compared to the White majority. This way they can maintain their social networks and location-specific capital. Phillips et al., (2007) state that staying within the same local area also increases feelings of safety and an absence of racism and discrimination towards ethnic minority groups.

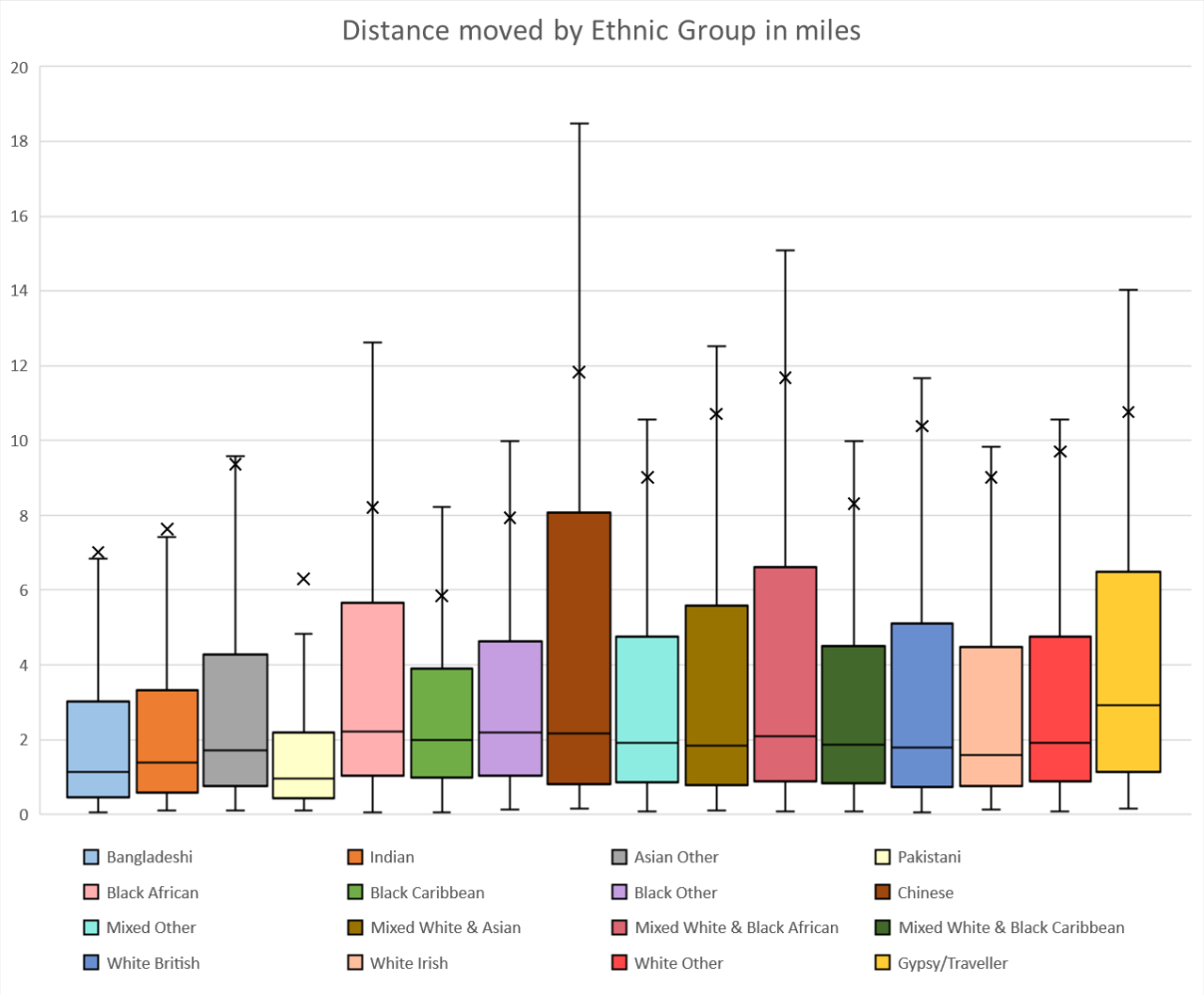

Figure 17: IQR and average distance moved in miles by ethnic group

Figure 18 shows the distance moved by FSM eligibility. Pupils who have been eligible for FSM each school year across the educational life course (11 years) move the shortest distance on average of 6.5 miles. Pupils who have been eligible for FSM for only 1 year move the farthest distance on average of just over 11 miles. Pupils who have never been eligible for FSM across the educational life course move on average 10 miles which is the same for those who have been eligible for FSM for 2-4 years and 5-7 years. A number of years eligible for FSM only seems to make a difference to the distance moved for those who have been eligible every school year.

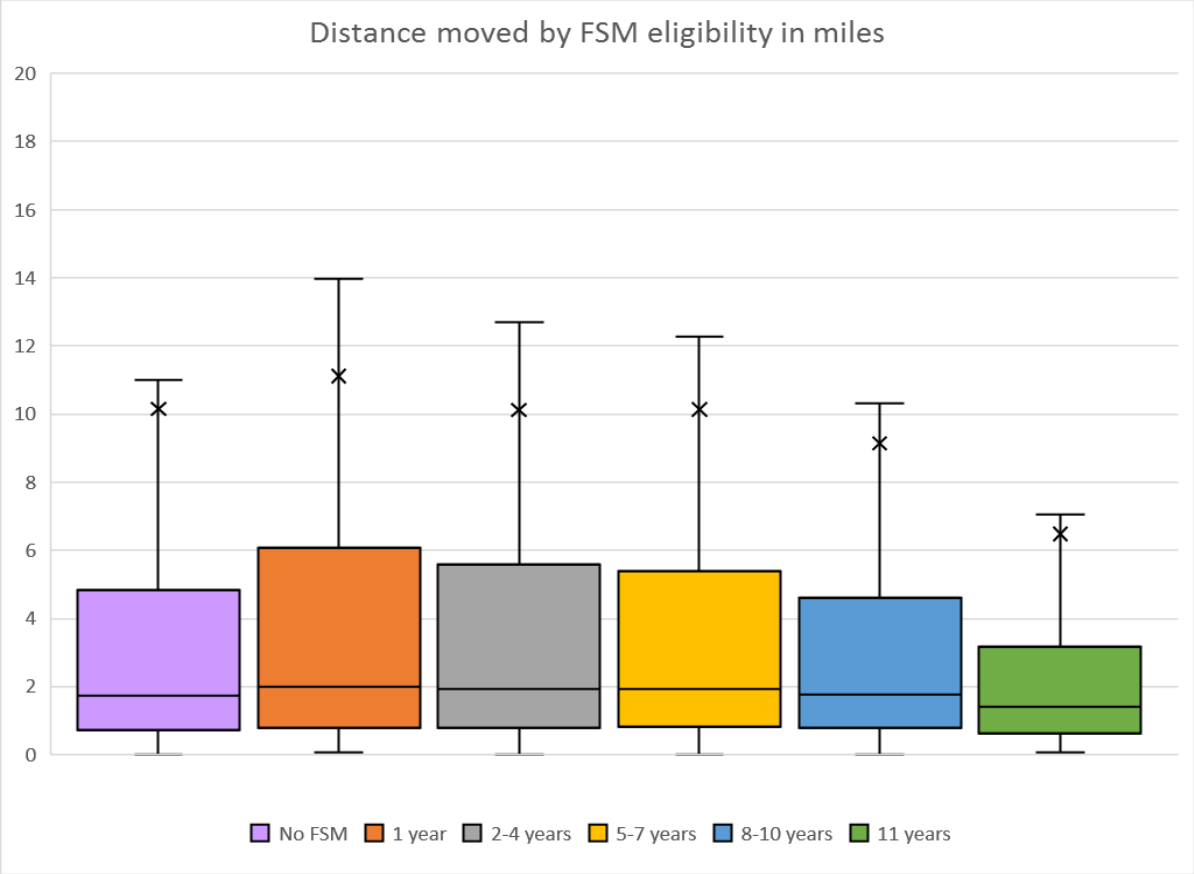

Figure 18: Figure 5.3: IQR and average distance moved in miles by FSM eligibility

The three figures (16, 17 and 18) suggest that there is a link between socio-economic status, neighbourhood deprivation, ethnicity and distance moved. In order to evaluate how ethnicity and socioeconomic status are related to distance moved in a more robust way, ethnicity, FSM eligibility and neighbourhood type will be evaluated against distance moved in miles in a two-level linear multilevel model.

5.4 Modelling distance moved (LSOA)

The model is set out as a two-level linear model to analyse the effect of ethnicity, FSM eligibility and neighbourhood type on distance moved in miles while portioning variance into the individual (level 1) and the LA in which a pupil lives (level 2). The first model will include those who have moved but never been eligible for FSM. The second model will include those that have moved and have been eligible for FSM.

The model equation is as follows:

$$y_{ij} = \beta_0 + \beta_1 x1_{ij} + \beta_2 x2_{ij} + u_{ij}$$
$$u_{ij} \sim N(0, \sigma_u^2)$$

Where the response y_{ij} is the total distance moved in miles for individual i in Local Authority$j$. β_0 is the overall intercept in the linear model for the distance moved when all else is constrained to zero. β_1 represents a one-unit change in a time-varying covariate $x1$ of individual i in Local Authority$j$. β_2 represents a one-unit change in a time-invariant covariate $x2$ of individual j in Local Authority$k$. A normally distributed random effect is included at level2 (u_j) to control for unobserved time-invariant characteristics at the Local Authority level.

Table 13 shows the output for the two models, and the first evaluates distance moved by ethnicity and neighbourhood type for those who have never been eligible for FSM. The second model evaluates distance moved by ethnicity and neighbourhood type for those who have been eligible for FSM, which is broken down by different durations of eligibility in model 2.

Model 1 shows that all ethnic groups not eligible for FSM move a greater distance on average than White British pupils apart from Black African pupils who move 1.6 miles less on average. Traveller and Gypsy pupils not eligible for FSM move the greatest distance at 10 miles on average. Those not eligible for FSM moving between the most deprived neighbourhoods, move the least distance which confirms the hypothesis set out by Cooke (2010) that residential mobility, especially among people with lower socio-economic status, generally involves shorter distances. Those that move between the least deprived neighbourhoods and mid deprived neighbourhoods also move shorter distances in comparison to those who upgrade or downgrade neighbourhoods considerably. Pupils who move from the least deprived neighbourhoods to the most deprived neighbourhoods move on average 23

miles more than those moving between the most deprived neighbourhoods. This is to be expected as a big social move usually requires a big spatial move, therefore, confirming that those that change neighbourhood types are more likely to move farther distances than those moving within the same neighbourhood type.

Model 2, on the other hand, shows that Bangladeshi pupils eligible for FSM move on average 2.4 miles less than White British pupils eligible for FSM and Black African pupils eligible for FSM move on average 0.54 miles less. Model 2 shows that those eligible for FSM between 5 and 10 years, move further on average than those only eligible for 1 year. However, pupils eligible for FSM each school year across the educational life course move on average 4.5 miles less than those only eligible for 1 year.

One of the biggest differences between model 1 and 2 is neighbourhood type. High>High moves for those eligible for FSM are greater than those moving between the least deprived neighbourhoods and mid deprived neighbourhoods, compared with model 1. It is possible that this may be due to a classification inaccuracy with the IMD. Although the neighbourhood may score a low number in terms of deprivation, some living in the neighbourhood may individually have a lower-socioeconomic status than the neighbourhood suggests, which is one main criticism of the IMD as a measure, also known as the ecological fallacy. Noble et al., (2004) state that an area measured as relatively deprived by an index may contain large numbers of people who are not deprived and, conversely, areas which are relatively less deprived might contain deprived people. However, LSOA's are relatively homogenous areas as they are built on OA's which are designed to include individuals living in similar housing types.

Distance (Miles)	Model 1 No FSM	Std. Err.	P value	Model 2 FSM	Std. Err.	P value
Ethnic Group **Reference: White British**						
Bangladeshi	0.71	0.44	0.11	-2.43	0.48	0.00
Indian	0.56	0.27	0.04	3.51	0.54	0.00
Pakistani	5.46	0.43	<0.01	3.34	0.65	0.00
Black African	-1.61	0.28	<0.01	-0.54	0.34	0.11
Black Caribbean	3.40	0.27	<0.01	2.43	0.31	0.00
Chinese	5.70	0.65	<0.01	2.42	1.57	0.12
Mixed	2.44	0.22	<0.01	1.52	0.28	0.00
Other	3.11	0.32	<0.01	-0.18	0.37	0.63
White Other	2.31	0.27	<0.01	3.16	0.39	0.00
Traveller/Gypsy	10.06	2.18	<0.01	2.54	1.42	0.07
Neighbourhood Type **Reference: High>High**						
Low>High	22.99	0.32	<0.01	19.63	0.52	0.00
High>Low	9.79	0.21	<0.01	17.20	0.34	0.00
Low>Low	3.57	0.16	<0.01	-3.63	0.37	0.00
Mid>Mid	2.94	0.16	<0.01	-1.24	0.21	0.00
Low>Mid	12.44	0.18	<0.01	7.10	0.36	0.00
High>Mid	4.09	0.16	<0.01	7.24	0.18	0.00
Mid>Low	5.26	0.16	<0.01	1.54	0.32	0.00
Mid>High	5.55	0.19	<0.01	5.48	0.22	0.00
cons	13.06	0.88	<0.01	22.96	0.68	0.00
Years Eligible for FSM **Reference: 1 year**						
2-4 years FSM				0.54	0.20	0.01
5-7 years FSM				2.23	0.21	0.00
8-10 years FSM				2.36	0.21	0.00
11 years FSM				-4.48	0.25	0.00

Random Effects Parameters **Model 1**	Estimate	Std. Err.	95% Conf. Interval	
Level 2: LA	247.44	19.34	209.54	285.34
Level 1: Pupil	2086.68	2.44	2081.89	2091.46
Model 2				
Level 2: LA	133.07	10.62	112.25	153.90
Level 1: Pupil	3452.45	5.02	3442.61	3462.29

Table 13: Two-level linear multilevel model output evaluating distance moved

The random effects parameters have been calculated for both models to indicate how much of the variance can be explained by the two levels, the individual pupil and the LA that they live in. The variance partition coefficient (VPC) have been calculated and are as follows:

Model 1:

Level 1: Person: 2086.68 / (247.44 + 2086.68 + 3.29) = 0.893

Level 2: LA: 247.44 / (247.44 + 2086.68 + 3.29) = 0.106

Model 2:

Level 1: Person: 3452.45 / (133.07 + 3452.45 + 3.29) = 0.962

Level 2: LA: 133.07 / (133.07 + 3452.45 + 3.29) = 0.037

The person-level VPC in model 1 is 0.893 which signifies that 89% of the variance can be explained at the individual level, indicating that distance moved varies the most based on the individual context, or in this case household context. Just over 10% of the variance can be explained by Local Authority, meaning that geography only has a smaller influence on distance moved. Model 2 shows that when accounting for the number of years eligible for FSM more of the variance is explained at the individual level. Only 4% is explained at the LA level. Neighbourhood variation is, therefore, lower when FSM eligibility is accounted for, suggesting that FSM eligibility is geographically patterned.

The residuals (as shown in appendix 10.2) for both model 1 and model 2 show that the greatest distances moved for both FSM and non-FSM pupils are in Cornwall, Eden, Torridge South Hams and North Devon. In fact, the top 10 LAs are all within the South West including Somerset and Devon, except for Richmond in Greater London, which is the only inner-city LA with a greater than average distance moved. The moves with the greatest distance take place in more rural areas with much smaller population densities, a move out of one Hamlet or village to another is likely to be several miles meaning pupils will have to move further. Due to their size moving from an LA like Cornwall or Devon will require moving a further distance to reach the next LA compared to others. Moving shorter distances is more common in inner-city areas where population densities are much higher, and distances moved are likely to be shorter. The residuals for model 1 and 2 differ for the shortest distance moved for FSM and non-FSM students. The shortest distance moved for FSM pupils are all in Greater London, with the shortest distance for pupils living in Islington, Hammersmith, Camden and Lambeth. For pupils not eligible for FSM the shortest distances moved are in Brent, Oadby located in East Midlands and Rochdale located in the North West.

So far, the tables, figures and model has shown that there are differences in type of move, whether that be to a more or less deprived neighbourhood, and distance moved by ethnic group and socio-

economic status. The analysis so far has used the entire NPD cohort which covers England as a whole. The LA residuals in model 2 highlighted that there are differences in distance moved across the UK with the top 10 shortest distances moved being within Greater London and the residuals for model one had Richmond in the top ten for the greatest distance moved on average. Greater London, therefore, is an interesting case study as the population is not representative of England as a whole. It is ethnically and socio-economically diverse and provides a good sample of NPD data in which to gain a better understanding of the types of neighbourhood's pupils move from and to, and the distances travelled.

5.5 A big dataset tells small stories 2: Greater London

In order to have a more focused understanding of how pupils within the NPD cohort are moving around the LSOAs, this section will focus solely on Greater London and the 33 boroughs within it. London has a diverse set of social and ethnic characteristics. Some LSOAs are the most deprived in the country while others are some of the most affluent in the UK. The ethnic minority population in London is also higher than the national average. Figure 19 shows the 33 Boroughs (also known as Local Authorities) within London. A total of 64,008 NPD pupils lived in one of the London Boroughs during their first year of school, which is approximately 8.5% of the total cohort. Of this cohort, 55,890 stay living in or move within Greater London over the educational life course, just over 8,000 pupils leave Greater London during the educational life course.

Figure 19: Map of the 33 Boroughs in Greater London

5.5.1 LSOA moves in London

Figure 20 shows the percentage of LSOA moves in each London Borough, based on the borough pupils were living in during their first year of school. Over 60% of the NPD cohort living in Newham during their first year of school move one or more times during the educational life course, compared with pupils living in Richmond during their first year of schooling, where only 39% of the NPD cohort move one or more times. For those living in Haringey during their first year of schooling, 25% move two or more times during the educational life course. Hackney has the largest percentage of pupils moving five or more times (almost 2%).

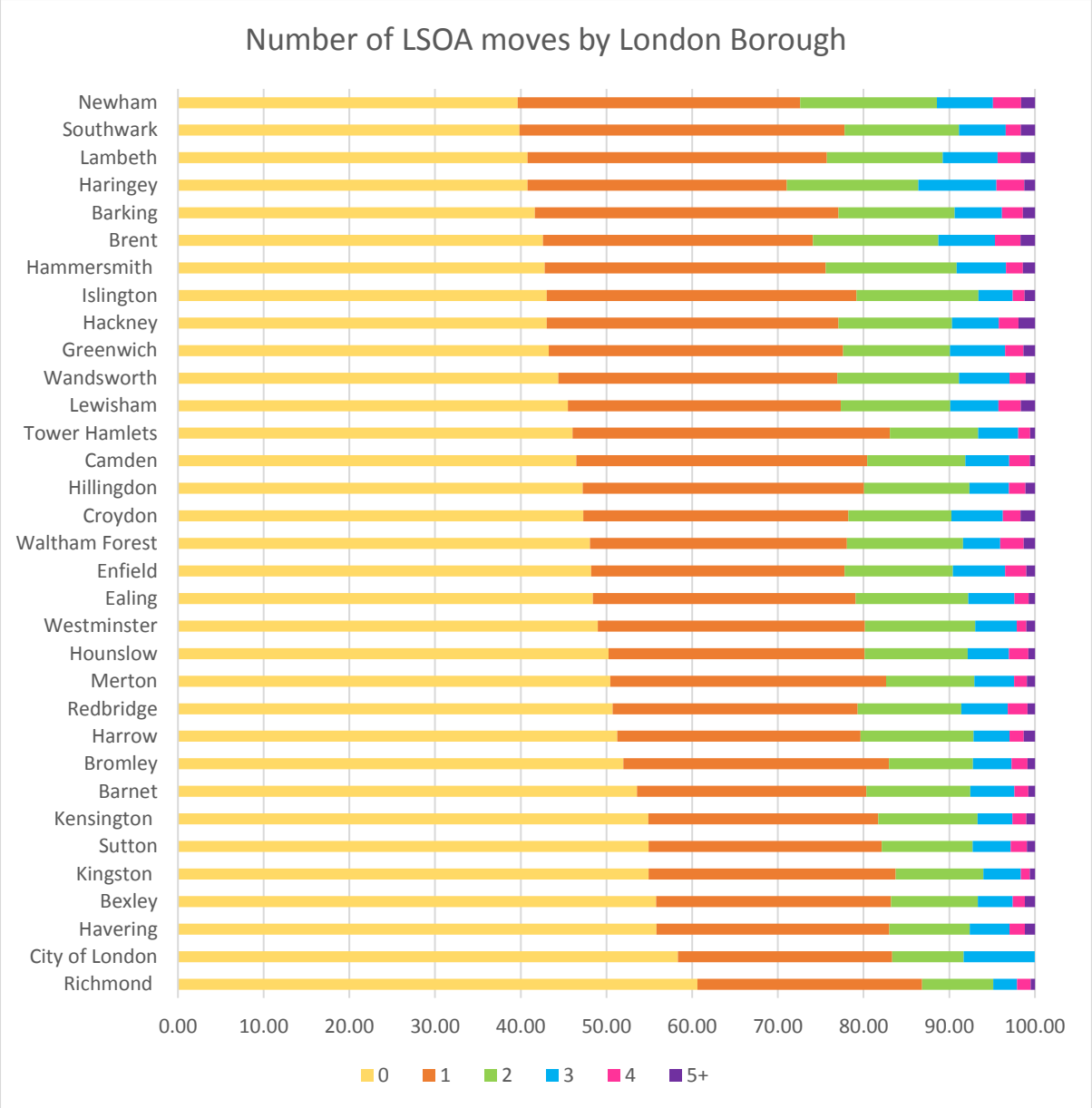

Figure 20: Percentage of LSOA moves by London Borough pupils lived in during their first year of school.

Figure 21 compares the origin London LA in 2002 with the final destination of pupils in 2013, breaking this down to moving within the same London LA, moving to another London LA and leaving London altogether. Almost 70% of those living in Bromley during the first year of school move only within Bromley over the educational life course, 68% in Havering and 66% in Bexley. These three LAs have the largest White British population in London, and also some of the highest house prices in the city. Only 10 pupils living in City of London move, so the 40% moving elsewhere only accounts for four pupils, City of London is an outlier anyway as it only has a very small population compared to the rest

of the London Boroughs. In Merton only 42% move within the same LA they lived during their first year of school, followed by 45% in Barking. Over 35% of pupils in Hillingdon and 33% of pupils in Kingston who move, leave Greater London and live in an LA outside of the city. This also reflects why the two LAs have the greatest average distance moved. In Brent, the average distance moved is over half of that of Hillingdon, with 85% of those moving, staying within the same LA or moving to an LA in London.

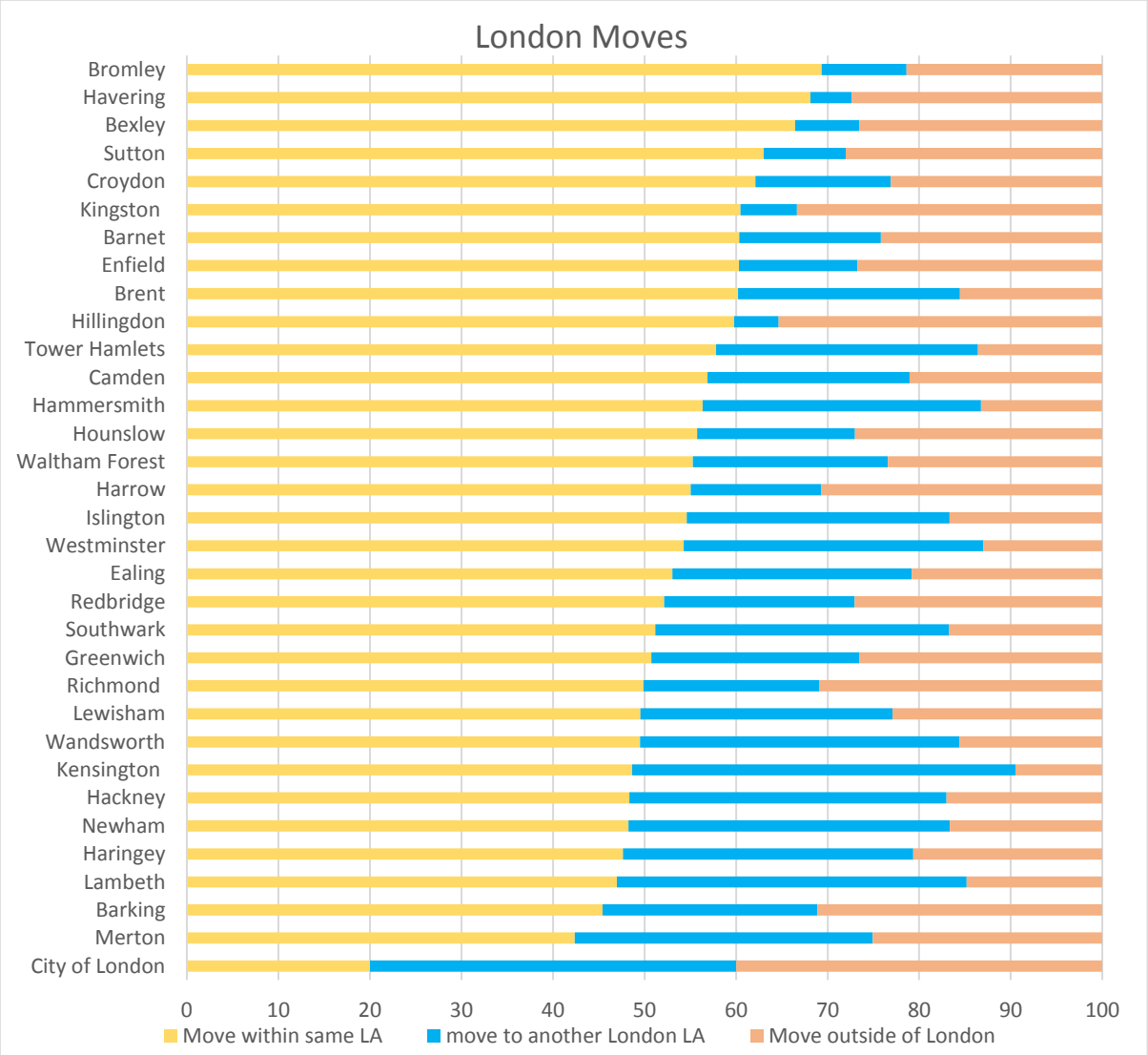

Figure 21: Destination of move (in same LA, to another London LA or LA outside of London

5.5.2 Ethnic and socio-economic profile in London

In this case study, the focus of analysis will be on the main ethnic minority groups, Bangladeshi, Indian, Pakistani, Black African, Black Caribbean as well as White Other and White British. Table 14 lists the

number and proportion of each ethnic group within the NPD cohort living in London. This is then compared to the proportion of each ethnic group in the NPD cohort across the whole of England. There is a larger proportion of all ethnic minority groups in London than that of England as a whole. The proportion of White British pupils in London is half of that as England as a whole.

Ethnic Group	Number London	% London	% England
Bangladeshi	1,632	4.86	1.24
Indian	1,450	4.31	2.13
Pakistani	1,102	3.28	2.8
Black African	3,882	11.55	1.64
Black Caribbean	2,414	7.18	1.36
White British	13,981	41.59	82.38
White Other	2,267	6.74	1.78

Table 14: Major ethnic groups by number and percentage in London and England

In order to get a better sense of where certain ethnic and social groups are living, maps have been created by calculating each individual ethnic group within the NPD cohort as a percentage of the total population living within each LA in Greater London. These are based on the London LA in which pupils lived during their first year of schooling in 2002. The maps for Bangladeshi, Indian, Pakistani, Black African, Black Caribbean and White Other (figures 22-27) have all been classed in the same way so a direct comparison can be made. The upper limit varies by group as for example, one LA has over 64% Bangladeshi pupils whereas for Pakistani pupils the largest percentage of the group among the LAs is 15%. The upper classification starts at 20.01%, as this would highlight a larger than expected population of an ethnic group within any London LA.

The White British Population shown in figure 28 is mapped differently as they make up over 90% of the total population of England. There are no LAs in London without a White British population, therefore, a zero category was not needed. There are several LAs with a White British population of over 80% so this is the starting number of the upper category classification, so it was possible to identify areas where there are also a very small ethnic minority population.

Figure 22 shows that 64% of the NPD population in Tower Hamlets is Bangladeshi, which is the largest percentage of any ethnic minority group living in an LA within London. Bangladeshi pupils are concentrated in inner-city London in LAs such as Newham and Camden, with very small numbers living in the outer London Boroughs such as Sutton and Richmond. Figure 23 shows that Pakistani NPD pupils are most concentrated in Redbridge, Waltham Forest and Newham, with very small numbers living in South East of London such as Bromley and Bexley. Indian pupils (as shown in figure 24) are most

concentrated in the West of London in LAs such as Hillingdon, Harrow and Ealing, as well as in Redbridge and Newham. Very small numbers of Indians live in the inner city LAs of London such as Southwark, Lambeth and Camden. Figure 25 shows that Black Africans are concentrated in Southwark and Lambeth and are fairly represented across Greater London, other than in the South West in LAs such as Kingston and Richmond. Black Caribbean NPD pupils (figure 26) are most concentrated in Lewisham and Lambeth and are similarly to Black Africans represented across London other than in Richmond and Kingston and Sutton. White Other pupils (figure 27) are concentrated in the North of London in LAs such as Enfield and are represented across London.

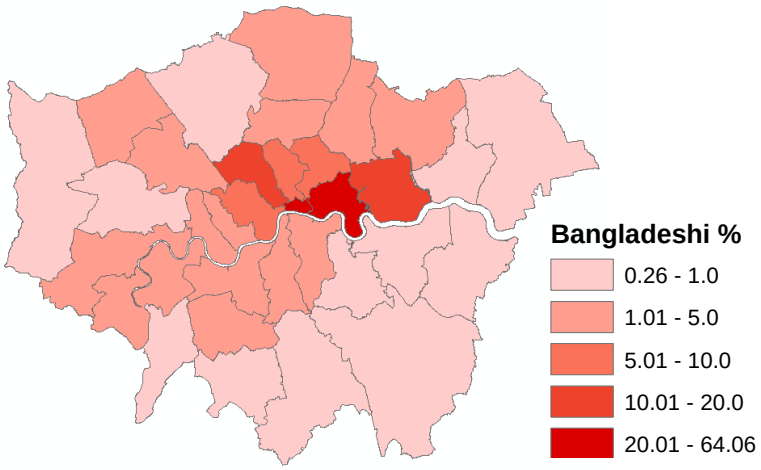

Figure 22: Bangladeshi pupils in NPD cohort living in London

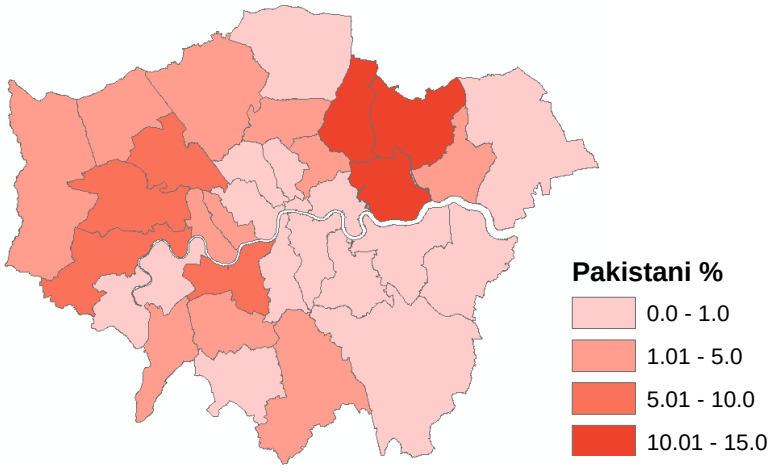

Figure 23: Pakistani pupils in NPD cohort living in London

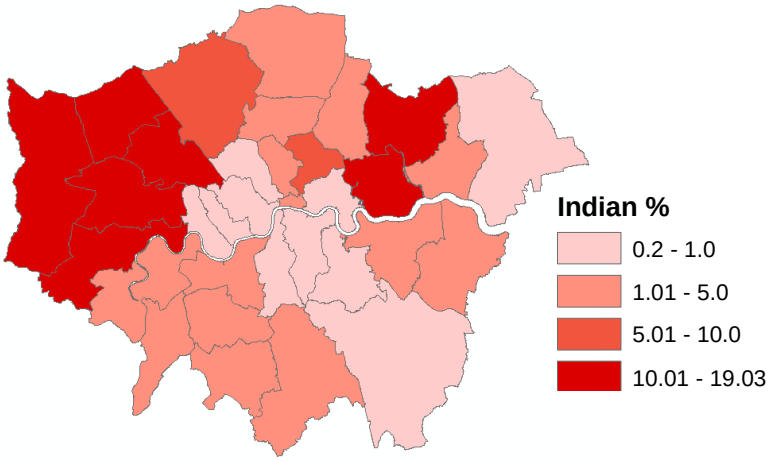

Figure 24: Indian pupils in NPD cohort living in London

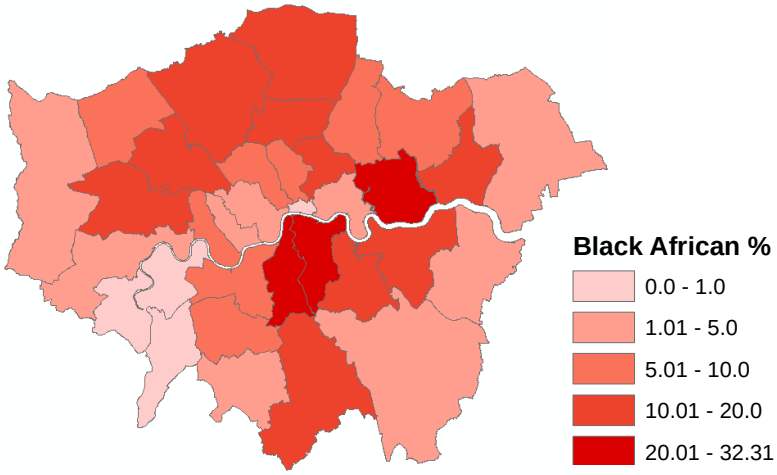

Figure 25: Black African pupils in NPD cohort living in London

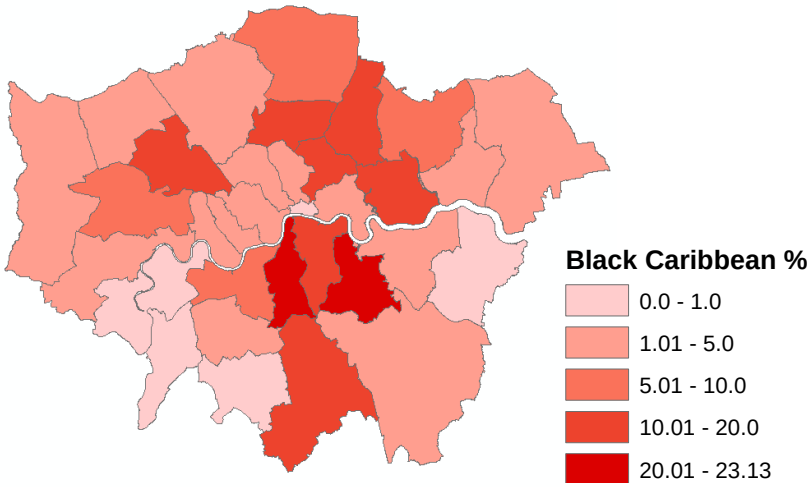

Figure 26: Black Caribbean pupils in NPD cohort living in London

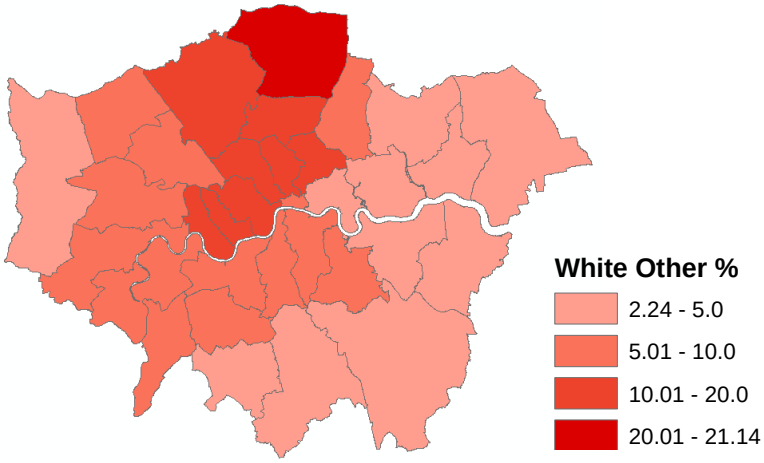

Figure 27: White Other pupils in NPD cohort living in London

Figure 28 shows that there are four LAs in London that have a less than 20% White British NPD population, these are Brent, Lambeth, Hackney and Tower Hamlets, with only a 13% White British population in Brent. There is over an 80% White British population in Havering, Bexley, Bromley, Sutton, with 89% White British NPD population in Havering.

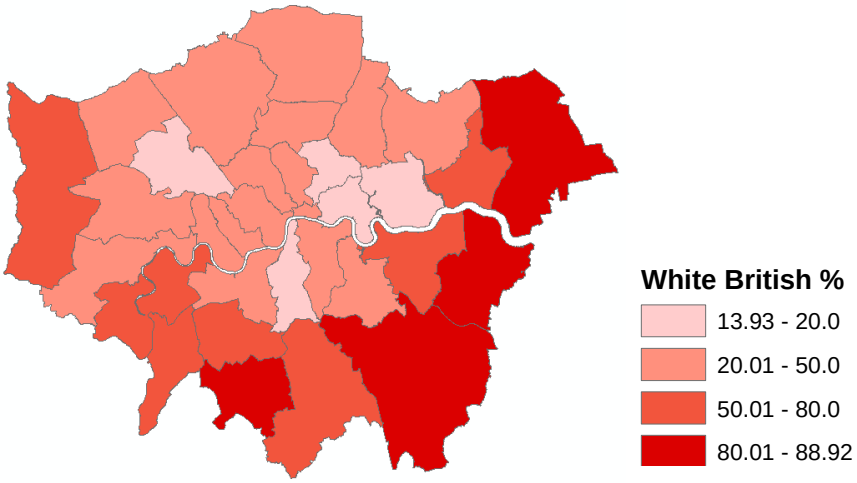

Figure 28: White British pupils in NPD cohort living in London

Figure 29 shows the percentage of the NPD cohort within each Borough across London who were eligible for FSM every school year across the educational life course. The data is based on the location pupils were living in during their first year of school in 2002. For the pupils living in Tower Hamlets during their first year of school, almost a quarter were eligible for FSM each school year. In Camden,

it is 16.5% of pupils, and in Islington, it is 14.5% of pupils. The lowest percentages of pupils being eligible for FSM each school year started school living in Kingston (1.48%) and Bromley (1.57%).

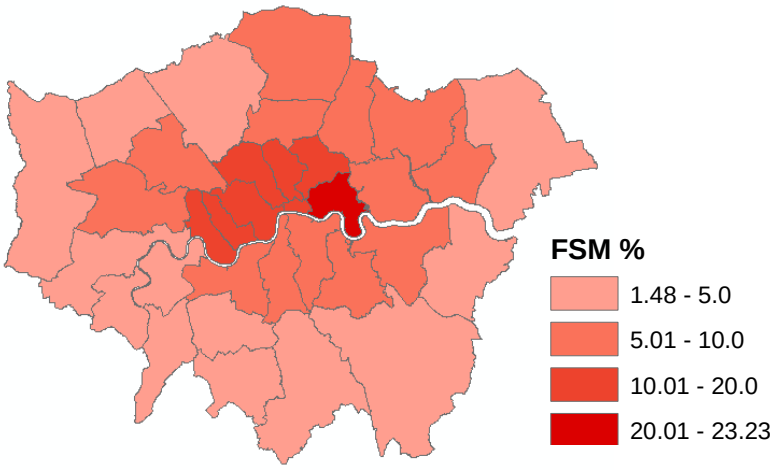

Figure 29: FSM eligibility of NPD cohort living in London

5.5.3 Evaluating moves in London by neighbourhood deprivation

Table 15 is a matrix depicting the IMD decile group score change between the start of school in 2002, and 2013. The matrix only includes pupils who lived in one of the 33 London Boroughs during their first year of school. Almost 71% of pupils living in one of the most deprived neighbourhood (deciles 8-10) move to one of the neighbourhoods in decile 10 during the educational life course. Of the pupils living in one of the least deprived neighbourhoods (deciles 1-3), over 91% move to one of neighbourhoods in decile 1. Only 0.5% of pupils (approximately 45) living in one of the most deprived neighbourhoods (decile 10) in 2002 at the start of school move to one of the least deprived (decile 1) neighbourhoods by the end of school. Conversely, only 0.2% of pupils (less than 4) living in one of the least deprived neighbourhoods (decile 1) move to one of the most deprived neighbourhoods (decile 10). The matrix shows that pupils are more likely to upgrade neighbourhoods significantly than downgrade neighbourhoods significantly over the educational life course. When comparing table 15 to table 10 which is a matrix of moves for NPD pupils living in England as a whole, pupils are more likely to be 'stuck in *type* of place' in London compared to England as a whole. Pupils may be able to upgrade neighbourhood moving out of London, but one of the reasons this may be difficult to do if remaining in London is due to the particularly high average house prices in London (£481,000) compared to the national average (£240,000) (HM Land Registry, 2018).

IMD Group	(2013)										
(2002)	1	2	3	4	5	6	7	8	9	10	Total
1	76.0	8.4	4.5	3.2	3.1	1.8	1.6	0.8	0.3	0.2	1,670
2	9.1	70.5	5.1	4.5	3.4	2.8	2.3	1.3	0.6	0.4	2,895
3	6.6	7.2	67.3	4.9	4.4	3.8	2.4	1.8	1.2	0.4	3,025
4	5.4	6.6	6.0	63.6	5.1	3.9	3.6	3.0	2.2	0.6	3,789
5	4.5	5.2	4.6	4.8	60.7	5.7	5.1	5.1	3.2	1.1	4,788
6	3.4	5.0	4.1	4.8	5.3	58.4	6.9	6.1	4.5	1.5	5,451
7	3.0	3.8	3.3	4.1	5.8	6.5	56.3	7.7	6.6	2.8	7,908
8	2.0	2.8	3.0	3.4	5.0	5.4	8.1	55.9	9.6	4.8	11,009
9	1.2	1.6	2.0	2.6	3.5	4.7	7.1	10.1	59.3	7.9	14,325
10	0.5	1.2	1.4	1.9	2.8	3.7	5.7	9.0	15.2	58.7	9,148

Table 15: IMD group change (%) between the first year of schooling (2002) and the last year of compulsory schooling (2013), for those starting school while living in a London Borough

Table 16 shows neighbourhood moves by ethnic group in London also broken down by FSM eligibility. Only moves between the most deprived and least deprived neighbourhoods as well as those who stay living in one of the most deprived or least deprived neighbourhoods and do not move have been included in the table. Almost 77% of Bangladeshis live or move between the most deprived neighbourhoods, 64% are eligible for FSM. Over 66% of Black African pupils live in or move between one of the most deprived neighbourhoods, with over 45% eligible for FSM. The table also shows more clearly the variation among the White British group; over 26% live in the same or move between the most deprived neighbourhoods, 14% of these pupils are eligible for FSM. Although White British tends to be the dominant group living in some of the least deprived LAs such as Richmond, Sutton and Bromley, there are large populations of White British living in more deprived parts of London such as Brent, Hillingdon and Newham.

	High> High (move)	High> High (stay)	High > Low	Low > High	Low> Low (move)	Low> Low (stay)	Mid	Total
Bangladeshi	6.54	7.36	0.79	0.03	0.20	0.56	10.0	777
Bangladeshi FSM	29.68	33.93	0.62	0.07	0.07	0.00	10.0	2265
Indian	5.11	14.82	1.66	0.20	1.23	4.73	49.8	2661
Indian FSM	5.43	7.06	0.41	0.03	0.12	0.00	9.34	767
Pakistani	5.25	12.36	1.24	0.24	0.38	1.24	27.5	1016
Pakistani FSM	13.56	17.04	0.67	0.00	0.14	0.00	20.0	1079
Black African	10.02	10.98	1.57	0.03	0.14	0.33	14.4	2351
Black African FSM	25.02	20.25	0.67	0.11	0.03	0.00	16.3	3944
Black Caribbean	9.05	13.16	0.88	0.05	0.27	0.77	21.6	2009
Black Caribbean FSM	19.81	18.43	0.45	0.02	0.05	0.00	15.4	2398
White British	3.32	8.89	2.71	0.18	4.64	12.26	41.4	28084
White British FSM	6.90	7.45	1.13	0.20	0.39	0.01	10.4	20554
White Other	4.99	10.05	1.49	0.12	1.32	4.26	31.1	4088
White Other FSM	18.76	15.19	0.66	0.24	0.10	0.00	11.6	1905

Table 16: Neighbourhood type by ethnicity and FSM eligibility in London

The analysis so far has shown that there are differences in the number of moves households make across each of the 33 London Boroughs. The ethnic composition of the boroughs differs considerably, with some areas such as Sutton being majority White (over 85%) compared with Brent that has a White British population of only 13%. In order to examine whether ethnic groups move to areas with a similar ethnic concentration, the next section analyses the change in ethnic composition between origin and destination neighbourhoods for those pupils living in London who have moved during the educational life course.

5.5.4 Moves by ethnic composition of neighbourhoods

To calculate the ethnic composition of each neighbourhood across London, census data from 2011 was used to calculate the percentage of each ethnic group within each Lower Super Output Area (LSOA) across the 33 London Boroughs. The London LSOA in which a pupil lived in in 2002 at the start of school was compared with the LSOA that the pupil lived in during their final year of school to show how the ethnic composition of the origin and destination neighbourhood had changed. The largest proportion of Bangladeshis living in a London LSOA is 65% in Tower Hamlets, for Pakistanis, it is 34%

in Redbridge. For Indians it is 65% in Brent, for Black Africans, it is 45% in Bexley, for Black Caribbeans it is 28% Croydon, for White Other, it is 43% in Kensington, and for White British, it is 97% in Bromley.

Figure 30 shows the interquartile range (IQR) for the difference in ethnic composition between origin and destination neighbourhood for each major ethnic group living in London. It is expected that White British will have the largest range as they have the largest population of all ethnic groups in London and therefore are likely to be a majority population in most neighbourhoods, but this will contrast with a few neighbourhoods where they have a relatively low percentage. The mean change (shown by an X) in ethnic composition for all ethnic minority groups is just under zero, as expected because over time neighbourhoods reproduce themselves with respect to many social and cultural dimensions (Hedman et al., 2011). The mean for Bangladeshi's being -5.45, showing that Bangladeshis on average move to neighbourhoods with a smaller Bangladeshi population as a percentage than their origin neighbourhood. White British pupils living in London on average move to neighbourhoods with a larger White British population than their origin neighbourhood. The IQR for all ethnic groups shows that in relation to their population size all groups tend to move between neighbourhoods with similar ethnic profiles.

Figure 30 shows that the range for change in ethnic composition when moving between neighbourhoods is largest for White British. in some instances, pupils move from an LSOA that is over 80% White British to an LSOA that is has a minority White British population of less than 10%; others will move from an ethnically diverse area being a minority to an area that is almost 100% White British. To explore this further. Figure 31 lists the destination of moves made by ethnic groups living in London. The figure shows that a third of moves made by White British pupils are to a neighbourhood outside of London, compared with Bangladeshi pupils, where only 6% leave London. This may be an example of 'White flight' or 'White avoidance' in which White British pupils are leaving London in order to live in less ethnically diverse areas. Harris (2014) however, found that there is evidence that a percentage of the White British population are happy to move into neighbourhoods where another ethnic group are relatively prevalent. To explore this further the next section evaluates whether Greater London is becoming more segregated over the educational life course to analyse whether there is a growing divide between White British and non-White British pupils living in Greater London.

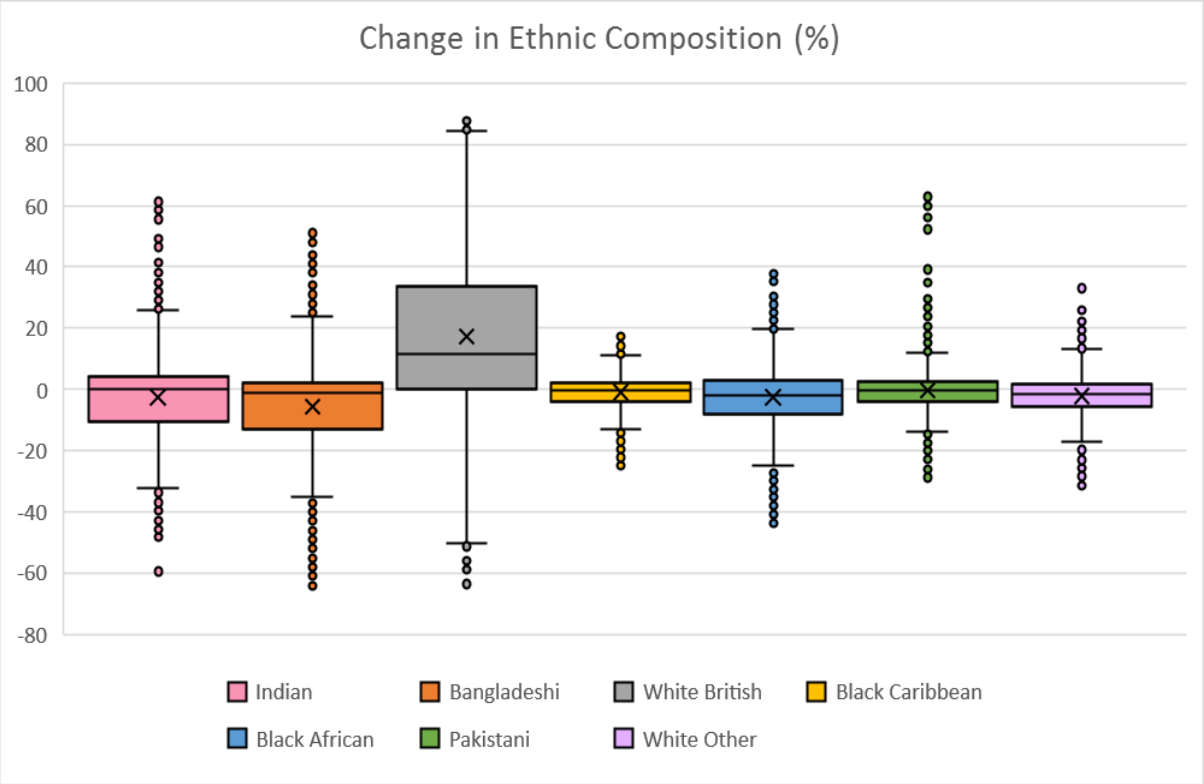

Figure 30: IQR showing change in ethnic composition between origin and destination neighbourhood

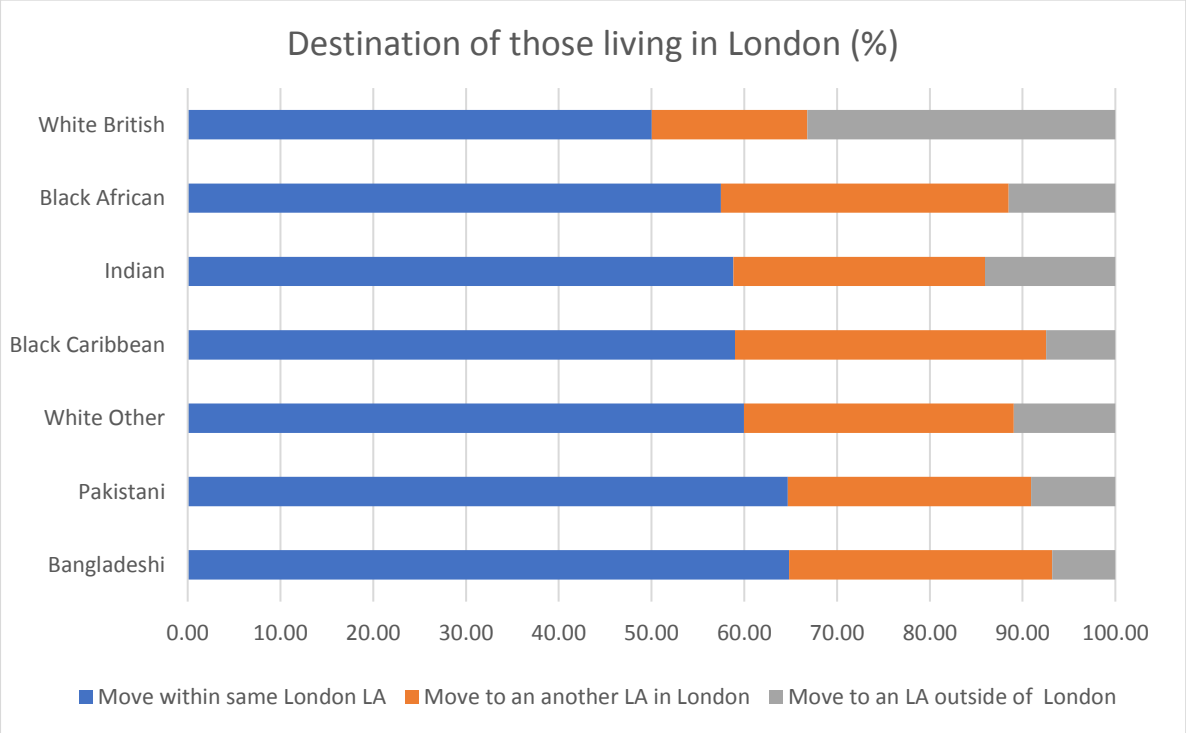

Figure 31: Destination of those living in London during their first year of schooling having moved

In order to evaluate whether London is becoming more segregated over the educational life course. The exposure index is used as it measures the degree of potential contact, between minority and majority group members across a geographical area (Massey and Denton, 1988). This therefore indicates whether ethnic groups in London are residentially exposed to one another. Table 17 lists the exposure indices for White British pupils and non-White British pupils living in Greater London throughout the educational life course Table 17 also includes the total population of White British and non-White British pupils living in Greater London each year and the total number and percentage of White British pupils who are eligible for FSM. The exposure indices have been calculated for those who were living in London during the first year of compulsory education in 2002 and remained in Greater London throughout the educational life course. The exposure index indicates the probability that a member of one group will meet or interact with a member of another group and is calculated as follows:

$$\text{Exposure Index} = \sum\left(\frac{n_i}{N}\right)\left(\frac{w_i}{t_i}\right)$$

where n_i is the non-White British population of an LSOA, N is the total population of non-White British in Greater London, w_i is the total White British population of an LSOA and t_i is the total population of an LSOA. The calculation is repeated with the values in reverse when the exposure indices for White British pupils are being calculated. The exposure index was calculated for all LSOAs in Greater London.

Almost twice the number of White British pupils move out of London over the educational life course compared with non-white pupils (as shown in table 17). The exposure index shows that despite more White British pupils leaving London compared to non-White British pupils the overall probability of a White British pupil interacting with a non-White British pupil and vice versa increases over the educational life course. Although more White British pupils are leaving London, the exposure of those remaining in London to non-White British is increasing, which suggests that White British pupils living in London may also be moving to more ethnically mixed LSOAs as well as moving out of the city, in order for the exposure index to increase slightly. This corresponds with the research of Harris (2014) which states that White British are willing to move into ethnically concentrated areas. Johnston et al., (2013) found when studying London that a lower proportion of the White British population are now living in majority White neighbourhoods than did over a decade ago.

For the exposure index to increase this also suggests that non-White British pupils may also be moving into neighbourhoods that are predominantly White British, which corresponds with figure 30 which shows that on average ethnic minority groups living in London tend to move to neighbourhoods with slightly lower populations of their ethnic group than their origin neighbourhood. Poulsen and Johnston

(2006) show that between the 1991 and 2001 in London, fewer Whites lived in the predominantly White areas and fewer non-Whites lived in the areas where their own group predominates. Instead, more Whites and non-Whites lived in relatively mixed areas. This has been termed as depolarised segregation. In London, ethnic minority groups have spread out from their former concentrated areas but at the same time there has also been a spatial de-concentration of the White British away from the city (Harris and Owen, 2017).

The reason for White British pupils leaving London may not be due to ethnic concentrations and 'White avoidance' but instead be due to socio-economic factors. The racial hypothesis proxy posits that people want to escape neighbourhoods with higher concentrations of ethnic minority residents because these neighbourhoods are deprived and not because they have an aversion to living in the same neighbourhood as minority-group members (Harris, 2001). Of the White British leaving London, just over a third are eligible for FSM, which is about 5% higher than the total number of FSM eligible NPD pupils who move across the whole of England. Families with children eligible for FSM may, therefore, be moving out of Greater London to areas with more affordable housing which have lower numbers of ethnic minority groups. It is also argued that on average, all ethnic minority groups in England are more likely to live in deprived neighbourhoods than the White British majority (Jivraj and Khan, 2013). It may be, therefore, that some families are moving into less ethnically concentrated areas because the housing is cheaper and living costs are more affordable rather than a desire to live in a majority White British neighbourhood.

Greater London NPD Cohort						
Year	White British population	Non White British population	Exposure Index White British	Exposure Index (non-White British	White British eligible for FSM	(%) eligible for FSM
2003	28053	35955	0.386	0.245	5002	17.83
2004	27178	34184	0.389	0.247	5044	18.56
2005	26459	35310	0.391	0.248	4908	18.55
2006	25862	35114	0.393	0.249	4594	16.6
2007	25339	34893	0.394	0.25	4176	16.48
2008	24583	33960	0.396	0.251	3838	15.52
2009	24378	34462	0.399	0.253	4006	16.43
2010	24181	34359	0.4	0.254	3867	15.99
2011	23989	34300	0.4	0.254	3785	15.78
2012	26839	33918	0.401	0.254	3554	14.89
2013	23765	34184	0.402	0.255	3316	13.95

Table 17: Population and Exposure Indices for White British and non-White British pupils living in Greater London during the educational life course.

Although potential reasons have been put forward, there is no way of knowing for certain why some White British pupils are moving out of London into less ethnically diverse areas, and why others may be moving into more ethnically concentrated neighbourhoods within Greater London. It may be a race issue and in fact due to 'White avoidance' or due to socio-economic reasons which are being masked as racial. Both may also be intertwined and leaving a neighbourhood is due to dissatisfaction with surroundings, due to race and socio-economic status. However, it is clear that segregation of White British and non-White British pupils is not increasing as the probability of both groups interacting does marginally increase over the eleven-year period.

5.6 Conclusion

This chapter contributes to the current literature by taking an analysis of residential mobility one step further, not only outlining who is moving but also the type of move that is taking place as well as the distance travelled. There are clear differences amongst ethnic groups, with Black African and Bangladeshi pupils for example more likely to be 'stuck in *type* of place' with the majority living the same or moving between the most deprived neighbourhoods. Only a very small number, less than 1.5% of all ethnic groups manage to upgrade or downgrade neighbourhood from the least deprived to the most deprived and vice versa; this is likely to be due to economic circumstances, as well as the cost or availability of houses in certain areas.

In terms of distance moved, there are also differences among ethnic groups and neighbourhood type, with Black Caribbean and Pakistani pupils moving the shortest distances on average and Chinese pupils moving the farthest. The literature suggests that moving shorter distances are more prominent among ethnic minority groups living in more deprived areas, specifically those living in social or LA housing (Thomas et al., 2015; Finney and Jivraj, 2013; Feijten and van Ham, 2007). The descriptive statistics and the multilevel models confirm that it is those households moving between the most deprived areas that move the shortest distance. This builds on literature that states that moves are made due to negative reasons such as unstable housing and socio-economic constraints (Coulton et al., 2012).

The case study of Greater London is a good example to highlight type of moves, due to its larger than average percentage of all ethnic minority groups compared to England. It is more difficult for pupils living in London to upgrade neighbourhood than it is for NPD pupils living in England as a whole. One of the potential reasons put forward for this was the house prices and increased the cost of living in

London, meaning the cost needed to 'trade up' in terms of quality of neighbourhoods would require much higher annual incomes.

In terms of ethnic composition, all ethnic minority groups in London tend to move to areas with similar ethnic compositions to their origin neighbourhood or to areas with slightly smaller populations. White British pupils, however, on average, tend to move to areas with lower ethnic minority concentrations than their origin neighbourhood. Some of the literature would suggest this is a sign of 'White avoidance' (Crowder, 2000) whereas others (Dekker 2013; Harris, 2001) suggest that this is an example of the 'racial proxy hypothesis' where people move because their neighbourhood is deprived and not because they have an aversion to living in the same neighbourhood as ethnic minority groups. The probability of White British pupils interacting with non-White British pupils increases slightly across the educational life course, suggesting that segregation is not increasing in Greater London and that White British pupils are moving into ethnically diverse neighbourhoods within London as well as moving out of the city, however this may be due to socioeconomic status rather than a desire to live in neighbourhoods with higher concentrations of non-White British.

This chapter along with chapter 4 has outlined who is moving LSOA, where pupils are moving and the types of moves that are taking place. The next logical step is to analyse and evaluate school moves, as the mobility literature suggests that school and neighbourhood are closely associated. In order to evaluate the impact mobility has on educational outcomes, both LSOA and school moves need to be analysed as they cannot be disentangled when relating mobility to an outcome.

Chapter 6: Who is moving school?

6.1 Introduction

The main empirical contribution of this thesis so far has been to evaluate LSOA moves by ethnic and social groups and to examine the type and distance of the move. The next logical step would be to evaluate the impact that moving LSOA has on life outcomes. However, as highlighted in chapter 2, studies of mobility must focus on both home and school moves, as both have been found independently to negatively impact on outcomes such as health, behaviour and education and therefore cannot be disentangled in mobility research. By only focusing on one aspect of mobility in isolation the influence is conflated incorrectly.

In order to have a complete overview of how NPD pupils move both home and school, in this chapter, school moves are evaluated based on ethnicity, Free School Meal (FSM) eligibility and geography to get a better understanding of whether certain social and ethnic groups have a greater propensity to move school than others and if this varies across both time and space. This addresses the third objective of this thesis "Is socioeconomic status, ethnicity and geography associated with school mobility?" Chapter 2 highlighted that school moves could often have more of a negative impact on certain ethnic minority groups in terms of education attainment due to cultural differences and in some cases language barriers (Gasper et al., 2010). Pupils from families with lower socioeconomic status have been linked to increased school moves due to other risk factors such as unstable housing, homelessness and other social issues (Mehana & Reynolds, 2004).

This chapter develops a case study which looks at the school mobility of Black Caribbean pupils living in Lambeth between primary and secondary school, to highlight some of the geographical differences in school mobility. Chapter 2 highlighted that non-compulsory school moves, especially those made without classmates, can have a negative impact on pupils as they have to adapt to a new school and teaching styles as well as make new friends, which can often be difficult, especially for older children, when friendship groups are often established earlier on in the educational life course (South et al., 2007).

The final section of this chapter evaluates those that move both school and LSOA during the same academic year by ethnicity, FSM eligibility and across time and space, to highlight whether certain groups are more likely to move both home and school during the same school year compared to others. It is expected that as LSOA moves and school moves have been highlighted to cause disruption to a pupil, these will be exacerbated if a pupil has to adapt to a new home environment and school environment during the same year.

6.2 The School System in England

In England, the school system is structured in two main ways. Children either attend Infant and Junior School, often housed within the same overarching Primary School, which teaches children from age 5-11. At age 11, pupils then move to Secondary School, which teaches children from age 11-16. In some parts of the country, there is a First, Middle and Upper School. First school teaches children for the first four years, ages 5-9, they then attend middle school for the next 4 years aged 9-13 and finally upper school for the final 3 years aged 13-16. The majority of pupils in England attend the infant, junior and secondary school system, but there are still several areas such as Bedfordshire, Somerset and Northumberland that still have schools operating the First, Middle and Upper school system.

6.3 Number of school moves and when they take place

In order to analyse whether a school move had taken place between two school years, the Unique Reference Number (URN) code for the school was analysed, to see if it had changed between two years. The problem with this method was that in some cases the URN code for an infant and junior school could be different even though it was on the same school grounds, so would indicate a move, when in fact the children were attending the same primary school. To overcome this, the URN codes were linked to the postcode of the school, using Edubase data (EduBase is a register of educational establishments in England and Wales, maintained by the Department for Education) so it was possible to see if an actual geographical school move had taken place, if there was no change in postcode, no school move had taken place. This also accounted for schools that had changed to academy status: when this happened there were instances where the URN had changed from the previous secondary school to a new academy, and so when comparing the URN code would signal a move. However, all pupils stayed within the same school, it was only the school type that had changed. Comparing the postcodes of the school in this instance was better as it would not signal a move. All postcodes for all schools attended by the cohort were analysed, if the postcode was the same as the previous year, it was given a value of 0 if the school postcode had changed, this indicated a move had taken place and therefore was given a value of 1. The values could then be added together to give an overall number of school moves made by each pupil within the cohort across the compulsory educational life course.

The analysis of postcodes between two school years accounted for the majority of school moves that had taken place, however in some instances, the postcodes would be marginally different even though the two schools were next to each other, and would be coded as a move, when in fact pupils were just transitioning from infant to junior school or lower to middle school across the road or in some cases

next to each other. To overcome this, it was possible to match postcodes by the beginning of the postcode. For example, matching BS8 2SS with BS8 2LR. Using the BS8 2 part of the postcode. This was able to then identify any compulsory transitions as 0, i.e. not a move.

However, there was still an issue for a small number of cases, where the majority, i.e. more than 50% of pupils all moved from junior school to the same senior school, but this was being marked as a move because the postcode was different. i.e. BS6 5EH to BS8 2LR. The school was only a short distance away, but the postcode was too different to be able to match to identify a non-move. A school move had of course taken place, but this was a compulsory move during a school transition period. Children have to move at this point. If they are moving at an expected time, i.e. the transition from junior to secondary school, or from first to middle school and they are moving with half of their classmates, this is a very different move than at a non-compulsory point of the educational life course where they are the only pupil in their class moving to a new school. These moves are likely to be more disruptive as children have to adapt not only to a very different school further away from home (or also have to move home to be closer to school), but they have no peers from their old school with them, so they have to make new friends. Weller (2006) study found that before the transition, participants who were not expecting to move with friends were generally less excited and more anxious.

It is therefore important to separate those that move at compulsory times with classmates, from those that moved at non-compulsory time points in isolation, as it has been found that making new friends is one of the main anxieties reported by pupils moving school (Galton, 2010). The interest is specifically on school moves that are likely to be disruptive, so the moves need to be classed to reflect this. Through extensive analysis of the data it was decided that any move which took place where more than 50 % of pupils moved schools at a transitionary point, i.e. junior to senior school, or first to middle school was marked as 0, any pupils who moved schools at a transitionary point with less than 50% of their classmates was marked as a 1, i.e. a school move had taken place. The analyses also flagged cases where for example the difference was marginal, 54% to 46% for example, where a primary school of 35 pupils moved to two secondary schools, 19 moving to one and 16 to the other, these were also classed for both groups as no school move as in this case pupils were moving in a large group to secondary school. This applied to only a small number of cases, in the majority of cases pupils move from one primary to one main secondary, or from one primary to several different secondary schools. The main aim of this analysis was to correctly highlight pupils who moved school in isolation or with only a small number of classmates from those that moved school in a large group. Using this method means that some pupils in the cohort will not be classed as having moved school across the

educational life cycle, as all moves will have taken place with a large number of classmates. The process of coding school moves is shown in figure 32.

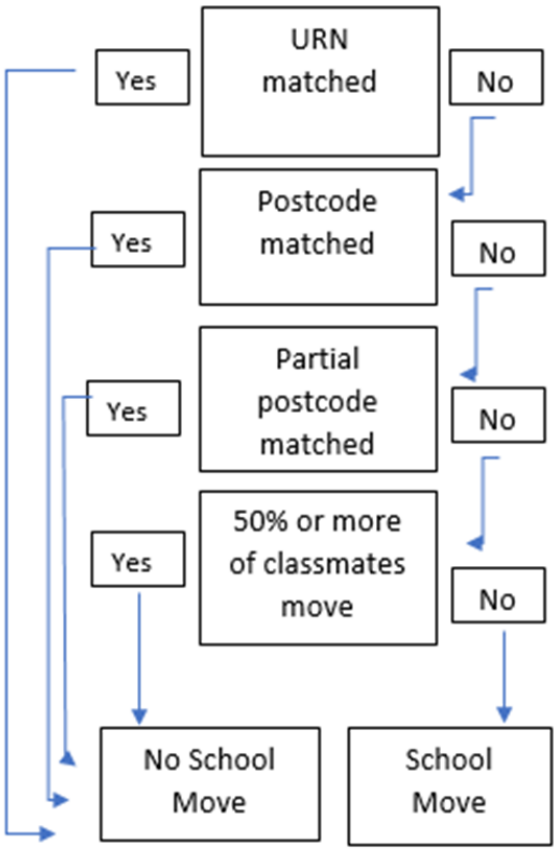

Figure 32: Process taken to code whether a school move had taken place

Table 18 shows the number of school moves that took place at the transition between each school year across the educational life course. As to be expected the most moves took place between 2008 and 2009 which is the transition point between primary and Secondary School. The number of school moves increases in the transition between 2004 and 2005. However, this is also a transitional point for some pupils who move from infant to junior school. Moves between 2010 and 2011 are also slightly higher than the previous school year. This is due to there being another transition point for some pupils from middle school to upper or secondary school, pupils may also move at this point as it is the year before GCSE study, and moving to a better school at this time may improve educational outcomes. Disruption for young people is likely to be higher if moving later in the curriculum. Strand and Demie (2007) find that pupil mobility within secondary education has a significant negative association with performance in GCSE's age 16 and has the biggest impact on those that move

secondary schools at the start of, or during year 11 (the final year of compulsory schooling). Table 19 outlines the total number of school moves that take place over the educational life course; just over 40% of pupils never move during the educational life course. Just under 60% of the cohort make a non-compulsory school one or more times during the educational life course. The number of pupils moving school decreases considerably with each additional school move. Only one pupil within the cohort moves school every year.

School Year	No. of pupils
2003-2004 (year 1-2)	26823
2004-2005 (year 2-3)	29178
2005-2006 (year 3-4)	23530
2006-2007 (year 4-5)	24590
2007-2008 (year 5-6)	16827
2008-2009 (year 6-7) (compulsory school change)	206942
2009-2010 (year 7-8)	12524
2010-2011 (year 8-9)	13041
2011-2012 (year 9-10)	9914
2012-2013 (year 10-11)	5585

Table 18: Number of Pupils who move each school year across the educational life course

Moves	Number	Frequency
0	203,765	42.85
1	200,112	42.08
2	53,114	11.17
3	13,483	2.84
4	3,727	0.78
5	1,018	0.21
6	279	0.06
7	55	0.01
8	10	0.00002
9	2	0.000004
10	1	0.000002

Table 19: NPD cohort: Total number of school moves

6.4 School moves by ethnic and social groups

In order to analyse whether certain ethnic or social groups have a greater propensity to move than others, the next series of tables highlight the number of school moves made by each ethnic group and those eligible for FSM across the educational life course. Table 20 shows that a very small proportion of the cohort moves school more than 5 times. Any pupil who moves school 5 or more times, therefore, have been grouped in the 5+ school moves category. Almost 50% of White British pupils within the cohort never move school during the educational life cycle, whereas only 10% of Black African pupils and just over 12% of Black Caribbean pupils within the cohort never move school. Almost 35% of Black African pupils within the cohort move 2 or more times. Interestingly it was Black African pupils within the cohort that had the highest percentage among all ethnic groups that moved LSOA the most. Just under 13% of White Irish and 14% of White British pupils move 2 or more times. Just over 2% of Gypsy and Traveller pupils move school 5 or more times, which is the highest among the ethnic groups but does only account for 7 pupils.

Table 21 shows school moves that have taken place at specific time points across the education life course, those that moved after their first year of school, the transitionary period between junior and senior school, as this indicates those that moved with classmates as a majority or those that moved in isolation or with a minority. Also highlighted are those that moved in their final year of school, which is likely to be disruptive as it is at this time that pupils are studying for their GCSEs. Almost 14% of Black African pupils move school after their first year in compulsory schooling, followed by 13% of Gypsy/Traveller pupils. This is considerably higher than for the other ethnic minority groups with on average only 6% of the cohort moving at this time. Over 81% of Black African and almost 81% of Black Caribbean pupils move between junior or senior school in isolation or as part of a minority. This is 20% more compared to White British pupils, with only 60% moving between junior and senior school as part of a majority. Only a small proportion of all ethnic groups move during the GCSE period. Almost 2% of Mixed White Black African pupils move during this time compared with only 0.4% of Indian pupils.

Table 22 shows school moves against number of years eligible for FSM. Over 77% of pupils who never moved school were also never eligible for FSM. Conversely, only 3.2% of those who never moved school were eligible for FSM each school year across the educational life course. Just under 15% of those who moved 5 or more times were never eligible for FSM. Over 85% of those moving school five or more times were eligible for FSM at some stage during the educational life course, with almost 60% eligible for FSM for five or more years.

School Moves by Ethnic Group (%)								
Ethnic Group	0	1	2	3	4	5+	(%)	Total
White British	46.8	39.6	10.0	2.6	0.7	0.3	100	391787
Traveller/Gypsy	36.4	35.5	13.1	9.5	3.4	2.1	100	353
White Irish	33.8	53.6	9.8	2.0	0.7	0.1	100	1523
Mixed White Asian	31.8	50.1	12.8	4.0	1.1	0.3	100	3464
Indian	29.0	56.1	12.1	2.3	0.4	0.1	100	10117
Bangladeshi	28.7	52.2	15.3	3.1	0.6	0.2	100	5874
Pakistani	27.9	54.3	14.0	3.0	0.5	0.2	100	13324
Mixed White Black	27.6	49.7	15.8	4.7	1.8	0.5	100	6335
Chinese	27.3	53.7	14.5	3.6	0.9	0.1	100	1276
White Other	25.4	52.4	16.6	4.4	1.1	0.3	100	8483
Mixed White Black African	25.2	49.6	19.8	4.0	1.0	0.5	100	1673
Black Caribbean	12.4	60.8	19.8	5.2	1.4	0.6	100	6461
Black African	10.0	55.4	25.2	7.1	1.7	0.3	100	7795

Table 20: School Moves by Ethnic Group

	2003-2004 (First year of school)		2008-2009 (Transition from Junior to Senior School)		2012-2013 (Move within GCSE period)	
	No move	Move	No Move	Move	No Move	Move
Bangladeshi	92.7	7.3	38.8	61.2	99.3	0.7
Indian	94.8	5.2	37.5	62.5	99.6	0.4
Pakistani	94.3	5.7	36.2	63.8	99.1	0.9
Black African	86.1	13.9	18.9	81.1	99.1	0.9
Black Caribbean	92.4	7.6	19.1	80.9	98.6	1.4
Chinese	92.7	7.3	36.4	63.6	99.7	0.3
Mixed White Asian	93.5	6.5	44.2	55.8	98.8	1.2
Mixed White Black African	92.4	7.6	37.2	62.8	98.7	1.3
Mixed White Black Caribbean	92.7	7.3	40.0	60.0	98.2	1.8
White British	94.8	5.2	61.2	38.8	98.8	1.2
White Irish	95.4	4.6	43.2	56.8	98.9	1.1
White Other	92.1	7.9	37.1	62.9	99.1	0.9
Traveller/Gypsy	86.9	13.1	57.4	42.6	98.6	1.4

Table 21: School Moves by ethnic group during the first year of school, the transition between primary and secondary and during the GCSE period.

	Number of School Moves							
No. of years eligible for FSM	0	1	2	3	4	5+	(%)	Total
0	77.3	70	53.8	36.3	24.7	14.9	100	203,765
1	3.6	4.3	6	7.5	7.4	6.3	100	200,112
2-4	7	8.9	13.5	18	20.4	20.4	100	53,114
5-7	4.7	6.4	10.3	14.7	18.9	24.8	100	13,483
8-10	4.1	6.1	10.6	16.1	21.1	25.3	100	3,727
11	3.2	4.4	5.7	7.3	7.5	8.3	100	1,365

Table 22: School moves by number of years eligible for FSM (%)

6.5 School moves by geography

Table 23 lists the Local Authorities (LAs) with the highest proportion of school movers during the transition between junior and secondary school. The LAs with the highest proportion of school moves are all in London. Nearly all of the NPD cohort living in Lambeth moved in the junior to secondary school transition without classmates. Only 18 pupils within the cohort lived in the City of London in 2008, but all moved school (transitioned without classmates) between junior and secondary school. The 18 pupils attended 4 different primary schools and then moved to 10 different secondary schools.

2008-2009 (junior to senior school)	No school move (%)	School move (%)
Local Authorities with the highest proportions of school moves		
Hammersmith and Fulham	8.4	91.6
Wandsworth	7.9	92.1
Greenwich	7.8	92.2
Southwark	7.2	92.8
Thanet	5.8	94.2
Islington	5.4	94.6
Merton	5.3	94.7
Dartford	4.7	95.3
Lambeth	2.9	97.1
City of London	0.0	100.0

Table 23: Local Authorities with the highest proportion of school moves (%)

6.6 The odds of moving school

The model is set out as a three-level model to analyse the effect of ethnicity, FSM eligibility and the school year on moving school while portioning variance into the occasion (level 1), the individual (level 2) and the LA in which a pupil lives (level 3). The model equation is as follows:

$$log\left(\frac{y_{ijk}}{1-y_{ijk}}\right) = \beta_0 + \beta_1 x1_{ijk} + \beta_2 x2_{jk} + u_{jk} + u_k$$

$$u_{jk} \sim N(0, \sigma_u^2)$$

$$u_k \sim N(0, \sigma_u^2)$$

Where the response y_{ijk} is the likelihood of a school move in period i for individual j in Local Authority k. β_0 is the overall intercept in log odds for moving house when all else is constrained to zero. β_1 represents a one-unit change in a time-varying covariate $x1$ in occasion i of individual j in Local Authority k. β_2 represents a one-unit change in a time-invariant covariate $x2$ of individual j in Local Authority k. A normally distributed random effect is included at levels 2 (u_{jk}) and 3 (u_k) to control for unobserved time-invariant characteristics that influence mobility throughout the study period.

The model (table 24) shows that the odds ratios of moving school for all ethnic minority groups are greater than that of White British pupils. The odds of moving school are 1.6 times higher for Black Caribbean pupils compared to White British pupils and 1.56 times higher for Pakistani pupils. One explanation for this, is that ethnic minority pupils are generally more concentrated in inner-city areas such as London (Phillips & Harrison, 2010), where there are more schools available for the larger populations meaning that places in primary and more specifically secondary schools are much more competitive. Pupils attending the same primary schools in large inner-city areas, especially in London are likely to move to several different secondary schools, therefore moving in isolation or with very few classmates, compared pupils living in more rural areas for example, where there is often only one or two primary schools and one main secondary school. Pupils who have been eligible for FSM during the educational life course have an odds ratio of 1.91 compared to those pupils who have never been eligible.

The model shows that the odds of moving school between 2008 and 2009 is 15 times that of school moves between 2003 and 2004 (at the start of the educational life course). This is to be expected as there is a compulsory move between junior and senior school, where nearly all pupils are likely to move school. Many moves will take place where pupils move in isolation without classmates, hence the higher number. More school moves take place during the beginning of the educational life course and the odds of moving decrease each year. The odds of moving between the final two years of school are the lowest. It is at this point that pupils are taking GCSEs, meaning moving at this point can be very disruptive and likely to be avoided if possible. Pupils moving school at this stage are likely to be changing school due to a long-distance house move or for a negative reason such as an exclusion at school.

School Move	Odds Ratio	Std. Err.	P value	95% Conf. Interval	
Reference: White British					
Bangladeshi	1.07	0.02	<0.01	1.03	1.11
Indian	1.22	0.02	<0.01	1.18	1.26
Pakistani	1.56	0.04	<0.01	1.49	1.63
Black African	1.18	0.02	<0.01	1.15	1.21
Black Caribbean	1.60	0.02	<0.01	1.56	1.64
Chinese	1.42	0.05	<0.01	1.32	1.53
Mixed	1.29	0.01	<0.01	1.26	1.31
Other	1.28	0.02	<0.01	1.25	1.32
White Other	1.26	0.02	<0.01	1.23	1.30
Traveller/Gypsy	1.22	0.08	0.01	1.06	1.39
Reference: No FSM					
FSM	1.91	0.01	<0.01	1.89	1.93
Ref School move 03_04					
School move 04_05	1.09	0.01	<0.01	1.07	1.11
School move 05_06	0.86	0.01	<0.01	0.85	0.88
School move 06_07	0.90	0.01	<0.01	0.89	0.92
School move 07_08	0.60	0.01	<0.01	0.59	0.61
School move 08_09 (compulsory school change)	15.43	0.11	<0.01	15.21	15.66
School move 09_10	0.44	0.01	<0.01	0.43	0.45
School move 10_11	0.46	0.01	<0.01	0.45	0.47
School move 11_12	0.34	0.00	<0.01	0.34	0.35
School move 12_13	0.19	0.00	<0.01	0.19	0.20
cons	0.04	0.00	<0.01	0.04	0.04

Random-effects	Estimate	Std. Err.	95% Conf. Interval	
Level 3: Local Authority				
var (cons)	0.15	0.01	0.12	0.17
Level 2: Pupil				
var (cons)	0.23	0.00	0.22	0.24

Table 24: Three Level Logit Binomial Multilevel Model output (School moves)

The random effects parameters have been calculated to indicate how much of the variance can be explained by the three levels. The variance partition coefficient (VPC) have been calculated and are as follow:

Level 1: Occasion: 3.29 / (0.15 + 0.23 + 3.29) = 0.896

Level 2: Person: 0.23 / (0.15 + 0.23 + 3.29) = 0.06

Level 3: LA: 0.15 / (0.05 + 0.23 + 3.29) = 0.04

The occasion level (the school year in which pupils move school) has a VPC component of 0.896 meaning that time is the most important factor when it comes to moving school, accounting for 90% of the variance. The person-level VPC is 0.06 which accounts for 6% of the variance at the individual level, demonstrating that moves vary based on the individual. Only 4% of the variance can be accounted for by Local Authority, meaning that geography does not have a major influence on the frequency of school moves. However, the residuals show that there is difference in the propensity to move school among Local Authorities.

The residuals (as shown in appendix 10.3) for the model show that there is a rural/urban difference with more school moves taking place in larger cities, specifically in London boroughs, and fewer moves taking place in more rural LAs such as Harborough in Leicestershire and West Oxfordshire. Burgess et al., (2017) found that rural areas are characterised by fewer choices and a higher proportion of successful first choices. Despite the seeming lack of choice, the existence of school choice enables households to bypass their closest school if desired, and therefore play an active part in their child's allocation to school without moving home. This will be explored further in the next case study.

6.7 A big dataset tells small stories 3: Lambeth

Table 25 highlighted that almost all pupils living in Lambeth moved school during the junior to secondary school transfer period. Lambeth is located in the central London area, south of the River Thames highlighted in green as shown in figure 33. The Lambeth Local Authority is one of the most ethnically, culturally and linguistically diverse boroughs in Britain (Demie, 2005). Largely residential, it is one of the most densely populated places in the country, with more than 100 people living in each hectare, which is twice the London population density (Lambeth Council, 2016). Over 50% of pupils within the NPD cohort living in Lambeth are from Black and ethnic minority groups). There were 1767 pupils within the NPD cohort living in Lambeth between 2007-2008 (the final year of primary school) and 2008-2009 (the first year of secondary school), a third of which were eligible for FSM at this time,

almost 90% were living in a neighbourhood ranked by the IMD in deciles 8-10, meaning that the majority of pupils were living in deprived neighbourhoods. The pupils living in Lambeth attended 153 different primary schools during 2007-2008 and then moved to 105 different secondary schools in September 2008.

Figure 33: Map showing the location of Lambeth Borough within Greater London

Figure 34 is a map showing the location of all primary schools (in blue) and all secondary schools (in orange) attended by NPD pupils living in Lambeth at the end of primary school and the beginning of secondary school. The Lambeth borough is highlighted in yellow. Just over half of all primary schools and half of all secondary schools attended by Lambeth NPD pupils are outside of the borough. In all cases, pupils living in Lambeth attending primary school move to a secondary school with a small minority of or no classmates. LAs such as Harborough in Leicestershire have almost the opposite pattern, in the majority of cases nearly all those attending the same primary school move to the same secondary school.

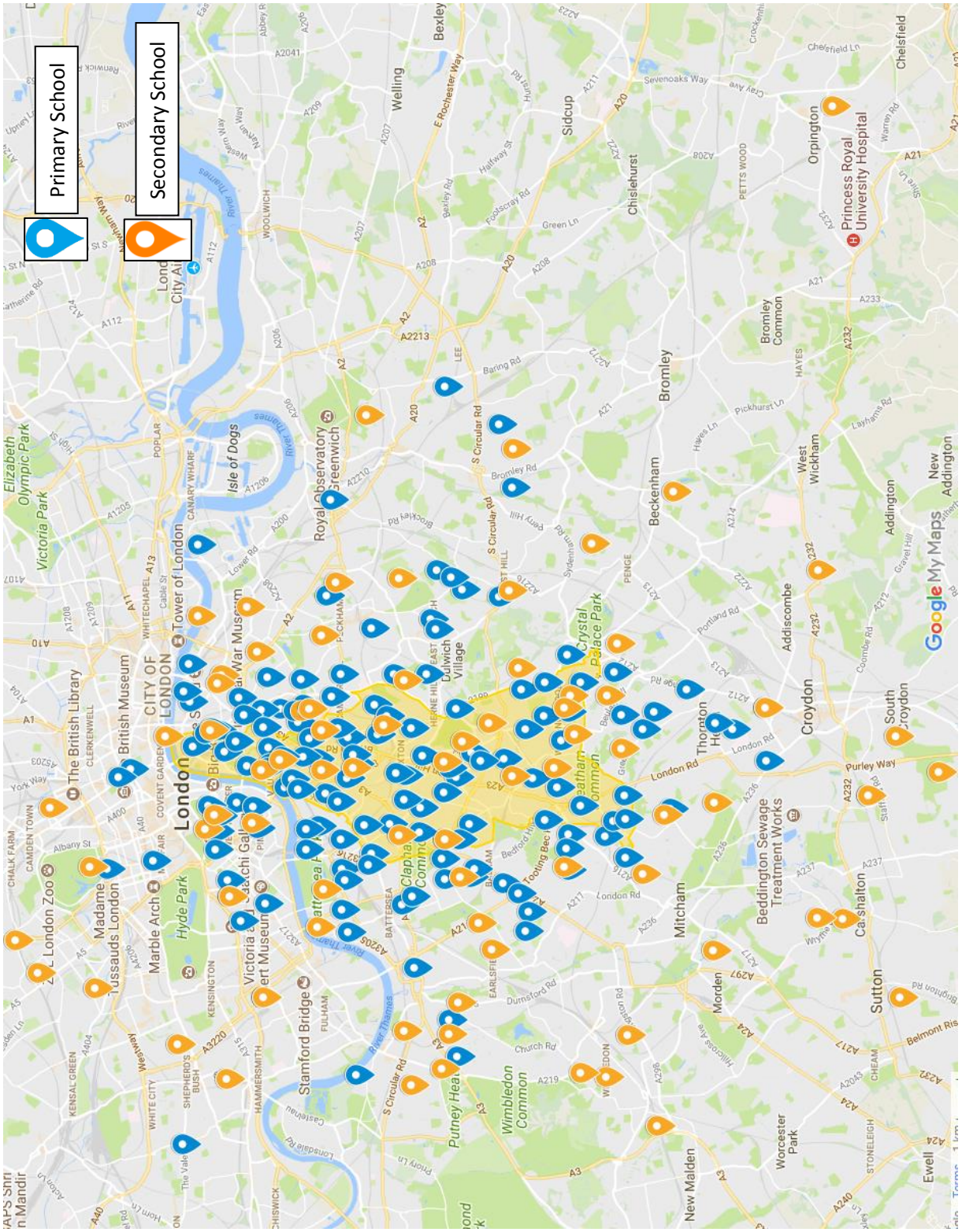

Figure 34: Location of primary and secondary schools attended by NPD pupils living within the borough of Lambeth (Google Maps and NPD data).

One of the defining characteristics of New Labour's policy on secondary education has been the expansion of parental 'choice' (Butler and Hamnett, 2010; Ball, 2008). Parents when applying for schools, provide a ranking of their preferred choices of school on a form that is submitted as part of a centralised system to their Local Authority (LA) (Burgess et al., 2017). On the form parents can provide up to six choices of school in rank order, depending on the area they live in. Children are then allocated to schools on the basis of parental choice and the availability of places at the schools selected. A set of published school prioritisation criteria are used when a school is over-subscribed. Typically, these include whether the child is looked-after by the local authority; whether the child has a statement of special educational need; whether the child has a sibling at the school already; the distance of the family home from a school; and in some cases, the faith or aptitude of a child (Burgess et al, 2017).

The main issue with the parental choice policy is that often demand is greater than places available. For most parents in London who live outside the school's immediate geographical area are limited to those schools which have places available but are less popular (Burgess et al., 2017; Butler and Hamnett, 2010). Many secondary schools in London are oversubscribed so often pupils do not often get their first choice of school and have to accept a place at a school lower in their list of choices (Butler and Hamnett, 2010). This may mean the school is further away from home than desired or not as high achieving. In England, the average number of pupils getting their first choice of secondary school is 83% (Butler and Hamnett, 2010). In 2016 it was reported in the Guardian that 42% of pupils in Lambeth did not get their first school choice, which is one of the highest rates across the country. In some cases, therefore, pupils living in Lambeth may have wanted to go to a particular school with the majority of their classmates but were unable to, which in turn creates a high number of pupils in Lambeth moving schools in isolation or with only one or two of their cohort. The demand for places at schools with good reputations and performance far exceeds the number of places available and many parents and their children are disappointed when they do not get one of their school choices and are forced to accept places in their local catchment area irrespective of the quality of the school (Butler and Hamnett, 2010).

The competition for school choice in rural areas is often lower, due to smaller population densities there are often only a small number of secondary school options available within geographical catchment areas. Burgess et al, (2017) state that those living in rural areas often only submit one secondary school choice compared to pupils in London where normally six choices are submitted, in the majority of cases pupils living in rural areas are allocated a place at the school that was their first choice, with there being de facto catchment areas in some rural villages, such that pupils are guaranteed a place within their village school (Burgess et al, 2015). This means as previously highlighted that non-compulsory school moves are less common in rural areas as pupils are likely to

move at compulsory time points with the majority of their classmates, as in many cases all of the pupils attending one primary school will move together to the same Secondary school.

Families with the financial means to do so also often move house to be within a specific geographical catchment area, to improve the chances of their child being allocated a place at their first choice of secondary school. In Lambeth, the median income is around £26,000 (Lambeth Council, 2016). The cheapest area in terms of house prices within Lambeth is Crystal Palace, where a median house price would require a household income of over £72,000 (Lambeth Council, 2016). Thus, purchasing a house in Lambeth for the majority is impossible. In terms of tenure, just over 65% of households in Lambeth are rented accommodation (Lambeth Council, 2016). Rental costs in London are also high so moving into more desirable areas also comes at a cost, also considering the cost of agency fees as well as a deposit.

This chapter so far has evaluated school moves by ethnicity, FSM eligibility and across time and space, finding that Black Caribbean pupils and Black African pupils move school the most and that there is a link between this and the location in which these pupils live. The majority of Black Caribbean and Black African pupils within the NPD cohort live in London, and as outlined in the case study, due to school choice, competition for places is high, which means greater demand for certain secondary schools meaning many pupils living in Lambeth do not get their first choice. Due to socio-economic factors, many are unable to move to a more desirable area, and so school choice becomes more restricted.

School moves and LSOA moves have both been evaluated by ethnicity, FSM eligibility across time and space. There are some pupils within the cohort that move both LSOA and school during the same year, as the literature suggests that moving home and moving school can have a negative impact on education, health and behaviour it is expected that moving home and school during the same year will be even more disruptive to a young person. The next section of this chapter will evaluate those who move both home and school and to see if certain social and ethnic groups are more likely to have a simultaneous home and school move than others.

6.8 Number of LSOA and school moves and when they take place

Chapter 3 analysed LSOA moves and so far in this chapter school mobility has been analysed, now both will be looked at together to see if there are certain ethnic or social groups that move home and school at the same time more frequently than others and if there is any pattern geographically across the entire NPD cohort. Table 25 lists the number and proportion of pupils who move both LSOA and school within the same year. Just over 81% of the cohort do not move both home and school simultaneously. Just over 14% move both school and home once during the same year, this proportion

decreases with each additional year. Three pupils within the cohort move LSOA and school during the same school year eight times.

Moving LSOA and School during the same year	Number	Frequency
0	387,822	81.55
1	67,396	14.10
2	14,776	3.11
3	4,000	0.84
4	1,170	0.25
5	301	0.06
6	82	0.02
7	16	0.003
8	3	0.0006

Table 25: NPD cohort: Total number of moves

Table 26 lists the number of moves made each school year. Moves are broken down into no moves, LSOA moves only, school moves only and both a school and LSOA move during the same school year. More pupils just move LSOA than just move school, apart from in the transition year between junior and secondary school when a greater proportion of pupils would be expected to move at this point. The number of pupils moving just LSOA remains fairly constant over the educational life course. The number of school and home moves increases slightly during 2008/09 which is when pupils are transitioning between primary and secondary school, to which home moves coincide, perhaps as families are moving to be nearer the school they have been assigned. The number of school and home moves taking place within the same year decrease considerably each year after 2009/09 with only 2,015 pupils moving both home and school during the final year of compulsory schooling.

School Year	No Moves	%	LSOA Move only	%	School Move only	%	School and LSOA move	%
2003-2004	418529	88.01	30214	6.35	8116	1.71	18707	3.93
2004-2005	414533	87.17	31855	6.70	12545	2.64	16633	3.50
2005-2006	426424	89.67	25612	5.39	9835	2.07	13695	2.88
2006-2007	421328	88.60	29648	6.23	10854	2.28	13736	2.89
2007-2008	427940	89.99	30799	6.48	5943	1.25	10884	2.29
2008-2009	250867	52.75	17757	3.73	183072	38.50	23870	5.02
2009-2010	438125	92.13	24916	5.24	6504	1.37	6021	1.27
2010-2011	438215	92.15	24310	5.11	7449	1.57	5592	1.18
2011-2012	441283	92.79	24369	5.12	5307	1.12	4607	0.97
2012-2013	444659	93.50	25322	5.32	3570	0.75	2015	0.42

Table 26: Number of LSOA, School and LSOA & School moves made each year across the educational life course

6.9 LSOA and school moves by ethnic and social group

Table 27 lists home and school moves during the same year decomposed by ethnic group. There is a peak during the 2008-09 transition period but apart from that the proportions of all ethnic groups moving both school and LSOA decreases each year across the educational life course. The most mobile ethnic group moving both home and school simultaneously across the educational life course is Gypsy and Traveller pupils. This is closely followed by Black African pupils, with over 10% moving both home and school between the first and second year of compulsory education. Almost 11% of Black African pupils and just under 12% of Black Caribbean pupils move both home and school during the transition period between junior and secondary school this may be as previously highlighted; a London effect, with over 80% of Black African NPD pupils and 68% of Black Caribbean NPD pupils living in Greater London. Many pupils living in London do not get their first choice of secondary school, often being allocated a place at a school that may be further away from home than planned which may then cause the need to move home to be closer to school (Burgess et al, 2017). However, the LSOA move may not necessarily be triggered by a school move, as in chapter 4 it was highlighted that again in inner city areas and London more specifically unstable housing and also socio-economic factors can also

mean moving LSOA is more prominent within these areas. Only a very small proportion of Indian and White Irish pupils move both school and LSOA in the same year.

Table 28 shows the number of years eligible for FSM by the number of times a pupil moved both home and school during the same year across the educational life course. Of those that never moved home and school during the same year, 74% were also never eligible for FSM. Only a small number (402) of pupils move school and home in the same year more than five times. For those that do, over 61% have been eligible for FSM for five or more years, with over 35% being eligible for eight or more years.

Ethnicity	03/04	04/05	05/06	06/07	07/08	08/09	09/10	10/11	11/12	12/13
Gypsy Traveller	10.8	7.8	8.7	6.0	9.5	7.4	3.4	4.8	2.1	0.5
Black African	10.1	6.4	5.8	5.0	3.4	10.9	1.7	1.3	1.2	0.3
Mixed White & Black African	5.7	5.1	4.1	3.5	3.6	8.8	1.6	1.1	1.1	0.4
Mixed White & Black Caribbean	4.8	4.4	3.8	3.6	2.8	8.1	1.9	2.0	1.4	0.7
White Other	5.9	4.5	4.2	4.0	2.7	8.0	1.5	1.2	0.7	0.3
Black Caribbean	4.7	4.0	3.4	3.0	2.3	11.7	1.0	1.2	0.9	0.4
Chinese	4.9	4.5	4.2	3.1	3.6	6.7	0.6	0.7	0.5	0.0
Bangladeshi	5.4	4.5	3.4	3.5	2.5	6.4	0.9	0.9	0.5	0.2
Mixed White & Asian	4.6	4.1	2.8	3.3	3.0	6.0	1.3	1.1	1.2	0.3
White British	3.6	3.3	2.7	2.8	2.3	4.4	1.3	1.2	1.0	0.4
Pakistani	3.7	3.6	2.5	2.6	1.7	6.2	1.0	0.7	0.6	0.2
Indian	3.5	3.3	2.5	2.5	1.5	5.8	0.7	0.6	0.4	0.1
White Irish	3.2	2.6	1.8	2.0	1.1	4.9	0.9	0.9	0.5	0.3

Table 27: School and LSOA moves by ethnicity each school year (%)

	No. of years eligible for FSM						
LSOA & School moves	0	1	2 to 4	5 to 7	8 to 10	11	Total
0	74.0	3.8	7.7	5.4	5.1	3.9	387,823
1	57.2	6.0	13.0	9.6	9.2	5.0	67,395
2	36.1	7.8	18.8	15.0	15.6	6.6	14,776
3	24.1	7.3	21.4	20.0	20.3	7.0	4,000
4	15.9	7.1	22.7	22.6	24.2	7.4	1,170
5+	11.2	7.5	19.9	25.9	28.4	7.2	402

Table 28: Number of school and LSOA moves during the same year by FSM eligibility

6.10 The odds of moving LSOA and School in the same year

The model (table 29) shows that the odds of moving both home and school during the same year is higher for all ethnic groups than White British pupil other than Black African pupils who have lower odds (Odds Ratio: 0.94). The Odds Ratio of moving both home and school is highest for Black Caribbean pupils at 1.61, closely followed by Pakistani pupils at 1.55. The odds of moving both LSOA and school during the same year are 2.62 times higher for pupils that have been eligible for FSM compared to those who have never been eligible. The odds of moving both home and school are highest in 2008-2009, as this is when pupils transition from primary to secondary school, where school moves are expected to be higher, and home moves may also increase to be in school catchment areas or nearer to the school a pupil has been allocated. The odds of moving both LSOA and school during the final year of compulsory education is almost zero, as this is thought to be one of the most disruptive times to move home and school as pupils are in preparing for GCSE exams.

LSOA & School moves	Odds Ratio	Std. Err.	P value	95% Conf.	Interval
Reference: White British					
Bangladeshi	1.08	0.03	<0.01	1.03	1.13
Indian	1.07	0.02	<0.01	1.03	1.11
Pakistani	1.55	0.04	<0.01	1.46	1.63
Black African	0.94	0.01	<0.01	0.91	0.97
Black Caribbean	1.61	0.02	<0.01	1.57	1.66
Chinese	1.38	0.07	<0.01	1.25	1.51
Mixed	1.22	0.02	<0.01	1.19	1.25
Other	1.31	0.02	<0.01	1.26	1.35
White Other	1.29	0.02	<0.01	1.25	1.34
Traveller Gypsy	1.45	0.10	<0.01	1.28	1.65
Reference: No FSM					
FSM	2.62	0.01	<0.01	2.60	2.65
Reference: LSOA & school move 03_04					
LSOA & school move 04_05	0.89	0.01	<0.01	0.87	0.90
LSOA & school move 05_06	0.74	0.01	<0.01	0.72	0.75
LSOA & school move 06_07	0.74	0.01	<0.01	0.72	0.75
LSOA & school move 07_08	0.59	0.01	<0.01	0.58	0.61
LSOA & school move 08_09	1.26	0.01	<0.01	1.24	1.28
LSOA & school move 09_10	0.34	0.00	<0.01	0.33	0.34
LSOA & school move 10_11	0.32	0.00	<0.01	0.31	0.32
LSOA & school move 11_12	0.26	0.00	<0.01	0.25	0.27
LSOA & school move 12_13	0.10	0.00	<0.01	0.10	0.11
cons	0.03	0.00	<0.01	0.03	0.03

Table 29: Three Level Logit Binomial Multilevel Model output (LSOA & school moves)

Table 30 recaps the odds ratios for those that move LSOA, those that move school and those that move both LSOA and school during the same year decomposed by ethnic group and FSM eligibility, to compare the effects for each type of move. Interestingly, although Black African pupils have the highest odds of moving LSOA and higher odds of moving school than White British pupils, they have the lowest odds of moving both LSOA and school during the same academic year. Black Caribbean pupils have the highest odds of moving school and other than Black African pupils the highest odds of moving LSOA. As previously highlighted Black Caribbean pupils have the highest odds of moving school and home within the same academic year.

	Odds Ratio LSOA moves	Std. Err.	Odds Ratio School Moves	Std. Err.	Odds Ratio LSOA & School Moves	Std. Err.
Reference: White British						
Bangladeshi	0.90	0.01	1.07	0.02	1.08	0.03
Indian	0.93	0.02	1.22	0.02	1.07	0.02
Pakistani	0.80	0.02	1.56	0.04	1.55	0.04
Black African	1.64	0.06	1.18	0.02	0.94	0.01
Black Caribbean	1.46	0.02	1.60	0.02	1.61	0.02
Chinese	1.11	0.10	1.42	0.05	1.38	0.07
Mixed	1.21	0.02	1.29	0.01	1.22	0.02
Other	1.33	0.02	1.28	0.02	1.31	0.02
White Other	1.27	0.03	1.26	0.02	1.29	0.02
Traveller/Gypsy	1.25	0.03	1.22	0.08	1.45	0.10
Reference: No FSM						
FSM	2.52	0.01	1.91	0.01	2.62	0.01

Table 30: Three Level Logit Binomial Multilevel Model output for LSOA moves, School moves and LSOA & School moves during the same year

6.11 Conclusion

This chapter has contributed to the current literature by highlighting that certain ethnic minority groups have more of a propensity to move school than others. Black Caribbean pupils move the most, with almost 90% of the cohort moving school one or more times over the educational life course, this compared to White British pupils with just over 50% of the pupils moving schools one or more times. The likely reason for this is based on geography, with almost 70% of the Black Caribbean NPD cohort living in Greater London, and the remaining cohort living in other inner-city areas such as Birmingham and Manchester. Due to the school 'choice' system, there is often greater demand than school places available, meaning that in London many pupils do not get there first choice, and this means that pupils

attending the same primary school do not attend secondary school with any or only very few of their classmates. In more rural areas where there are often predominantly White British populations, the school a pupil chooses as their first choice is often the school they are allocated a place, which is likely to be the reason that number of school moves are lower for White British pupils.

The model residuals showed that Lambeth had one of the highest number of school moves among all of the Local Authorities across England. The case study of school moves in Lambeth supports the theory that inner city living and a higher population density has an impact on school allocation, with just over a third of pupils being allocated a place at their school of choice, meaning many will attend a school lower down on their choice list of six, or in some cases not on their list at all, this means in many cases they may transition to secondary school in isolation, and have to attend a school that is perhaps further away than is desirable.

Socio-economic status also has an impact on school moves; in Lambeth, the majority of neighbourhoods fall into the 'high' category in terms of neighbourhood deprivation and over a third of pupils in Lambeth were eligible for FSM at the point of transition between primary and secondary school. The average income in Lambeth is much lower than that which is needed to purchase a house meaning families in Lambeth do not have the option to move to be nearer to a better school within or outside of the borough, whereas those in better financial situations have the option to move home to almost guarantee their first choice of school.

This chapter has also analysed LSOA moves and school moves that occur during the same year. This was evaluated against ethnicity, FSM eligibility and geography finding that Black Caribbean pupils move both home and school during the same year the most. Again, this was largely due to geography with Black Caribbean pupils being the most likely to move school due to living in the most deprived inner-city areas which has also highlighted that there is a positive association between FSM eligibility and LSOA moves suggesting that those with lower socio-economic status move more often. This is also supported geographically with higher proportions of moves taking place in more deprived areas. The educational stage has the greatest influence on moving, with 75% of the variance in the model being explained by time, with more moves taking place at the beginning of the educational life course, with number of moves decreasing by over half by the final year of schooling.

The next chapter will bring all of the analyses and results from this chapter and the previous two chapters together to evaluate the impact moving has on educational attainment. In order to find out if the differences among groups have any association with GCSE results, a predictor of future life outcomes.

Chapter 7: Does moving matter?

7.1 Introduction

The three previous analytical chapters have shown that certain ethnic and social groups have more of a propensity to move LSOA and school than others. Residential and school mobility is dependent on specific time points across the educational life course and varies across space. Ethnic and social groups move in different ways due to varying social, economic and cultural reasons. The final, necessary, part of this thesis therefore is to combine all of the analyses to better understand how moving impacts on later life outcomes, to address the final aim of thesis which is to evaluate the association residential and school mobility has with educational attainment.

As highlighted in Chapter 3, the main outcome variables used in this thesis are Key Stage 4 (KS4) point scores, also known as GCSEs or equivalent. Along with pupils achieving five A*-C at GCSE, it is a recognised benchmark target set for many employment opportunities or to gain a place in further education. It is also recognised by Government as a target in which to evaluate the quality of secondary schools. For this specific NPD cohort, GCSEs or equivalent are the final compulsory exams pupils will take during their educational life course, analysing GCSE results/KS4 point scores therefore it is the most appropriate outcome variable at which to evaluate LSOA and school moves.

Chapter 2 outlined many previous studies linking residential mobility (Gasper et al, 2010; Crowley, 2003; Pribesh & Downey, 1999) and school mobility (Mehana & Reynolds 2004; South et al, 2007; Strand & Demie 2007) to poor educational attainment. This chapter will not only to analyse associations between moving and educational attainment, but also assess how neighbourhood type, ethnicity and FSM eligibility is associated with educational attainment across time and space, paying attention to the occurrence of moves as well as the neighbourhoods in which pupils live and the schools they attend. This chapter will outline average point scores and five A*-C's achieved by LSOA moves and school moves and evaluate this by ethnicity and FSM eligibility, as well as neighbourhood type, distance travelled and geography using both descriptive statistics and regression analysis.

7.2 Association between educational attainment and moving LSOA and school

In order to analyse how moving is associated with educational attainment, table 31 shows the average KS4 point scores and percentage of pupils that achieved five A*-C for those who move only LSOA, pupils who only move school and those who move both LSOA and school during the same year. In all cases pupils who do not move have the highest KS4 point score and the highest percentage of pupils achieving five A*-C grades. Pupils moving school only score slightly lower point scores than those who

move LSOA the same number of times, those who move school five or more times score on average 24 points less than those who move LSOA five times and 12% less score five A*-C at GCSE, suggesting that both moving LSOA and moving school has a negative association with educational attainment but school moves have marginally more of an impact than LSOA moves. Pupils who move both home and school during the same year however score fewer points on average compared to those who just move home or just move school for the same number of times. Pupils who move both home and school five or more times score 16 points less than those that move school five times and 40 points less than those that move LSOA five or more times. Only just over 12% of pupils who move LSOA and school during the same year more than five times achieve five A*-C at GCSE.

Number of moves	None	1	2	3	4	5+
LSOA moves KS4 point score	355.1	347.8	336.6	326.9	316.4	291.3
School moves KS4 point score	352.5	352.1	331.7	311.2	291.5	267
Home & school moves KS4 point score	351.9	337.8	317.5	299.9	281.7	251.7
LSOA moves Achieved five A*-C (%)	59.4	54.8	47.6	41.5	36.7	29.4
School moves Achieved five A*-C (%)	57.1	57.7	45.7	34.4	25.1	17.4
Home & school moves Achieved five A*-C (%)	57.3	48.9	35.9	28	20.5	12.7

Table 31: KS4 point score and percentage achieving 5 A*C by number of LSOA and school moves

7.3 Educational Attainment by ethnicity, FSM eligibility and neighbourhood type

In order to analyse the difference in educational attainment by ethnicity at KS4, figure 35 shows the mean and Interquartile range (IQR) of KS4 point scores by ethnic group. The mean is marked with an x on the box plot, this shows that Chinese pupils have the highest KS4 points at 375 on average, which is equivalent to getting two As and six Bs at GCSE. Gypsy and traveller pupils have the lowest KS4 points at 171 on average, which is equivalent to six Fs and two Gs at GCSE. All ethnic groups other than Pakistani, Black Caribbean, Mixed White and Black Caribbean and Traveller/Gypsy on average score a higher number of KS4 points than White British pupils.

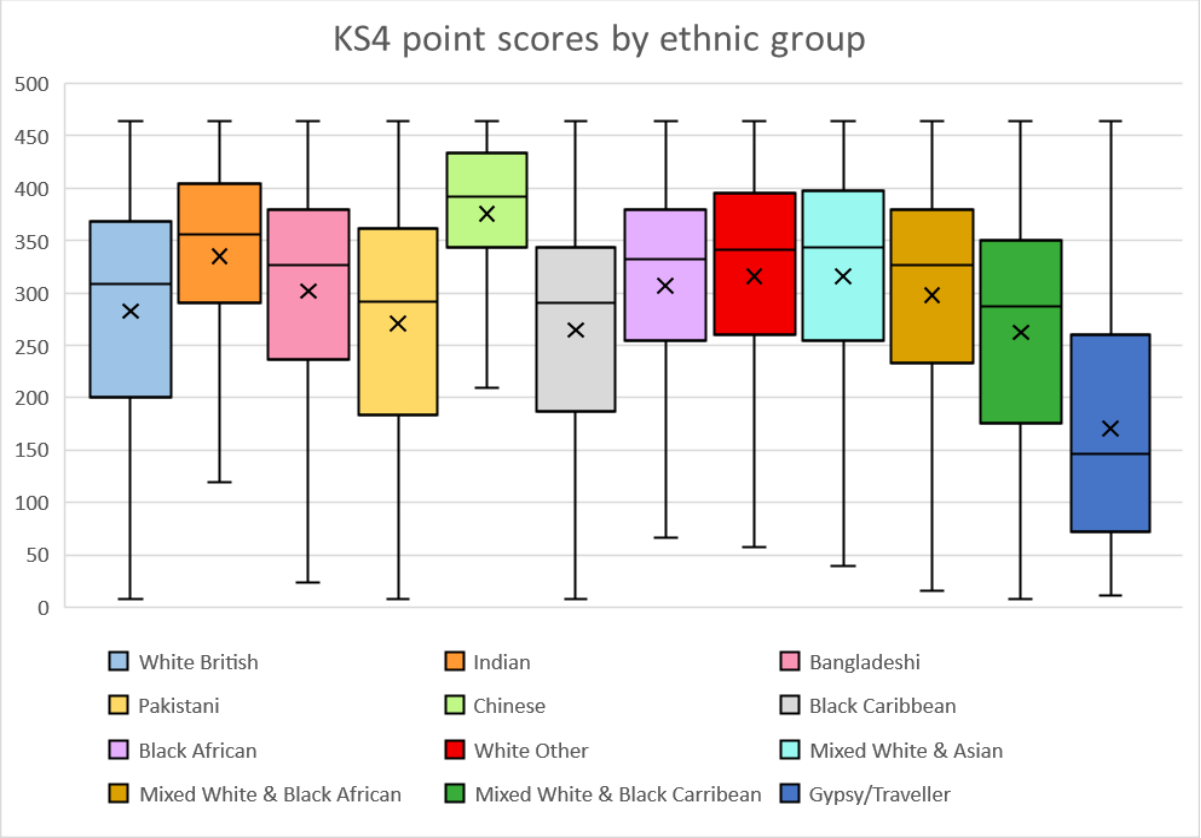

Figure 35: Box plot showing the IQR of KS4 point scores by ethnic group

Table 32 shows the percentage of each ethnic group that achieved five A*-C at GCSE. As expected, a similar pattern can be seen in table 32 to that of figure 35; almost 85% of Chinese pupils and over 72% of Indian pupils achieve five A*-Cs compared with Gypsy/Traveller pupils where only 15% achieve five A*-Cs. Just over half of Black Caribbean, Mixed White & Black Caribbean and Pakistani pupils do not achieve five A*-Cs at GCSE.

Ethnic Group	Did not achieve five A*-C (%)	Achieved five A*-C (%)	Total
Gypsy/Traveller	84.8	15.2	353
Black Caribbean	53.8	46.2	6,461
Mixed White & Black Caribbean	52.9	47.1	6,335
Pakistani	50.7	49.3	13,324
White British	45.9	54.1	391,787
Mixed White & Black African	41.2	58.8	1,673
Bangladeshi	38.8	61.2	5,874
Black African	38.2	61.8	7,795
White Other	34.6	65.4	10,006
Mixed White & Asian	34.2	65.8	3,464
Indian	27.5	72.5	10,117
Chinese	15.4	84.6	1,276

Table 32: Pupils achieving five A*-C (%) by ethnic group

In order to analyse the difference in educational attainment by FSM eligibility at KS4, figure 36 shows the mean and IQR of KS4 points score by FSM eligibility. Pupils who have never been eligible for FSM score on average the most points of 321 at KS4, which is the equivalent to getting on average three Cs at GCSE. The lowest point scores obtained are by pupils eligible for FSM for 8-10 years, getting on average 211 points and those eligible for FSM every year throughout the educational life course scoring on average 214 points which is equivalent to eight Es at GCSE. These are both considerably lower than the points scored by those who have never been eligible for FSM.

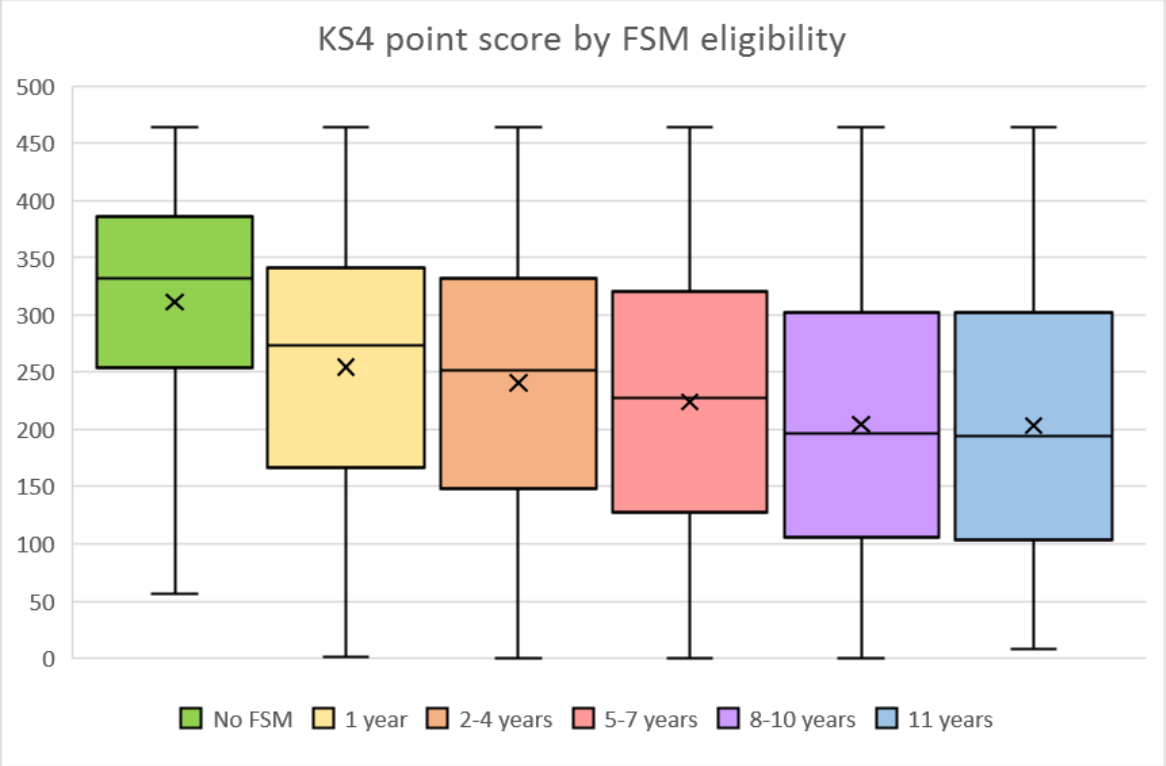

Figure 36: Box plot showing the IQR of KS4 point scores by FSM eligibility

Table 33 shows the number of years eligible for FSM by pupils who did or did not achieve five A*-C grades at GCSE. A similar pattern to that of figure 36 is shown. Of those who have never been eligible for FSM, over 64% achieve five A*-C at GCSE, compared with those who are eligible for FSM for between 8-10 years and all school years (11 years) where only just over 27% of pupils achieve five A*-C at GCSE.

No. of years eligible for FSM	Did not achieve five A*-Cs (%)	Achieved five A*-Cs (%)	Total
0	35.9	64.1	332,165
1	57.3	42.7	20,503
2-4	61.9	38.1	42,785
5-7	67.0	33.0	30,917
8-10	72.5	27.5	29,459
11	72.3	27.7	19,737

Table 33: Pupils achieving five A*-C (%) by FSM eligibility

Figure 37 shows the average KS4 point score for each ethnic group split between those who have never been eligible for FSM and those that have been eligible for FSM for at least one of more years during the educational life course. For all ethnic groups that are eligible for FSM means average KS4 point scores are lower than those who have never been eligible. The biggest difference is for White British pupils, with the difference of 96 points between those not eligible for FSM and those that are. This could be the difference between getting eight Cs at GCSE and eight Es. The smallest margin between those who are FSM eligible and those who are not, are Bangladeshi pupils with only 26 points difference. This would be the difference between non-FSM eligible pupils getting eight Cs and the same pupil eligible for FSM getting five Cs and three Ds.

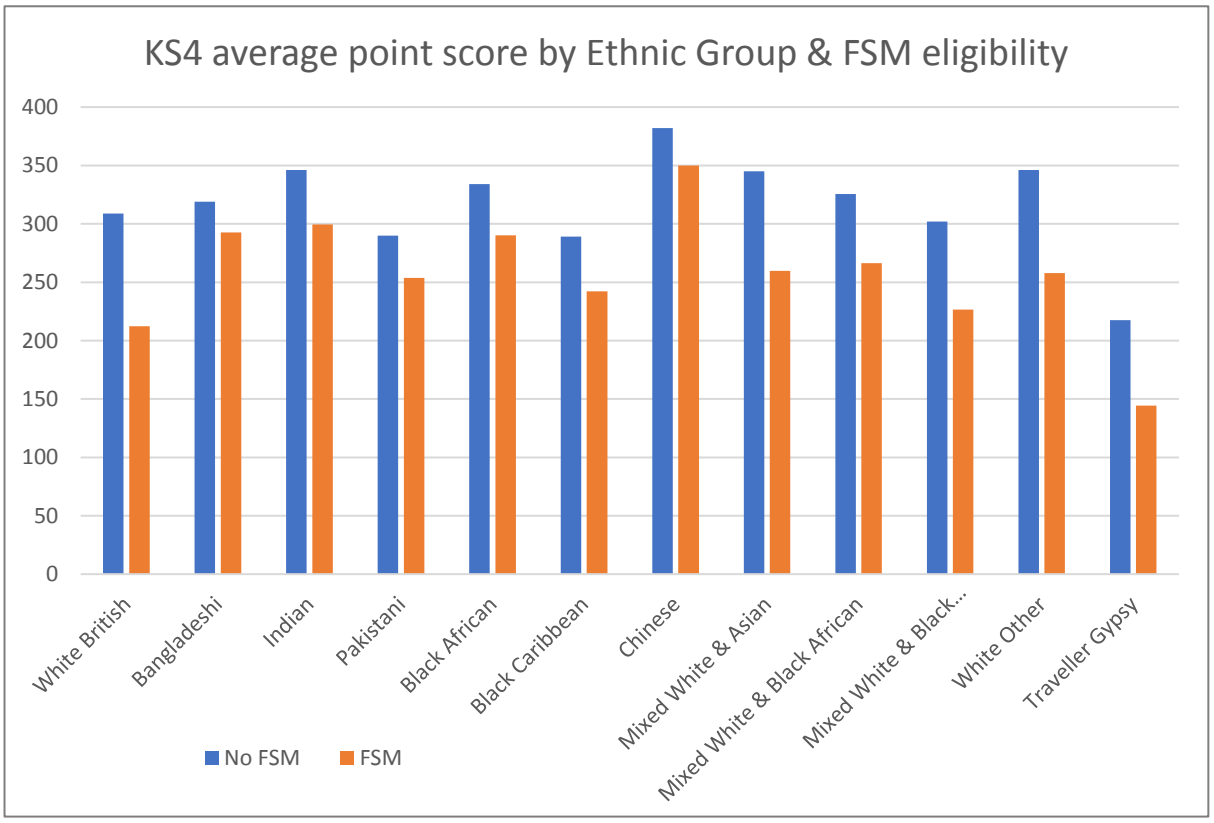

Figure 37: KS4 point score by ethnicity and FSM eligibility

Figure 38 shows the average KS4 point score by neighbourhood type. The whisker diagram only shows those that live in or move between the most or least deprived neighbourhoods, showing the two extremes. The mid classified neighbourhoods have not been included, as the focus is on the educational attainment of those in the most and least deprived neighbourhoods and to determine if moving between the least deprived or most deprived neighbourhoods has a more negative impact on KS4 point scores than living in the same neighbourhood throughout the educational life course. Those

that move from the least deprived to the most deprived neighbourhoods and pupils who move from the most deprived to the least deprived neighbourhoods have also been included to examine how upgrading or downgrading neighbourhood significantly is associated with educational attainment. Pupils that move between the most deprived neighbourhoods (High>High) score the lowest at KS4 achieving 227 points on average which is equivalent to eight Cs at GCSE. Those that stay living in the same deprived neighbourhood throughout the educational life course do marginally better than those that move between the most deprived neighbourhoods achieving 251 KS4 points on average which is equivalent to scoring on average six Ds and two Es at GCSE. Pupils living in one of the least deprived neighbourhoods who never move score on the highest on average, achieving 337 points. This is equivalent to scoring two Bs and six Cs at GCSE. In both cases pupils who move between the same type of neighbourhood do worse on average at KS4 than those who stay in that same neighbourhood type throughout the educational life course. Those moving from the most deprived to the least deprived neighbourhoods on average get fourteen KS4 points more than those who move from the least deprived to the most deprived, suggesting that moving to a better neighbourhood does have an association with educational attainment. This will be tested in a more statistically robust way later in the chapter.

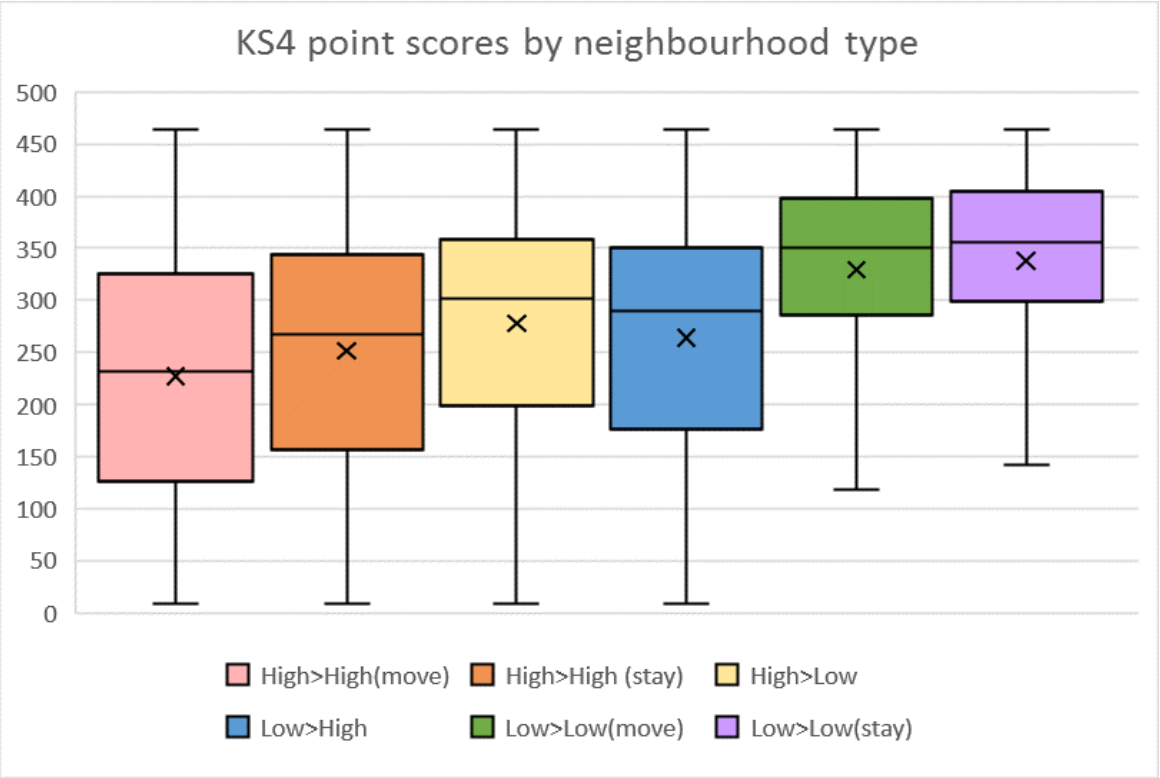

Figure 38: Box plot showing the IQR of KS4 point scores by neighbourhood type

Table 34 shows the neighbourhood type by pupils who did or did not achieve five A*-C grades at GCSE. Again, a similar patter to that of figure 7.4 is shown. Only 36% of pupils who move between the most deprived neighbourhoods achieve five A*- C at GCSE. Those that stay living in the same deprived neighbourhood throughout the educational life course do slightly better with almost 44% achieving five A*-C. Over 73% of those living in one of the least deprived neighbourhoods and do not move achieved five A*-C at GCSE, almost 70% of those that move between the least deprived neighbourhoods achieve five A*-C at GCSE. There is a clear pattern with those living in or moving from or to one of the most deprived neighbourhoods generally achieve lower grades than those living in or moving between the least deprived neighbourhoods. The pattern below also suggests that those moving between the same type of neighbourhood on average achieve lower grades than those staying in the same neighbourhood throughout the educational life course.

Neighbourhood type	Does not achieve five A*-C (%)	Achieves five A*-C (%)	Total
High > high (move)	64.1	35.9	53,413
High > high (stay)	56.1	43.9	78,149
High>Mid(move)	55.6	44.4	29,153
Mid>High (move)	59.3	40.7	16,364
Low > high (move)	53.3	46.7	3,345
High > low (move)	49.0	51.0	9,143
Mid > Mid (move)	48.1	51.9	40,359
Low>Mid (move)	39.7	60.3	15,836
Mid >Mid (stay)	39.6	60.4	98,143
Mid>Low (move)	38.7	61.3	22,181
Low > low (move)	30.4	69.6	29,146
Low > low (stay)	26.7	73.3	80,334

Table 34: Pupils achieving five A*-C (%) by neighbourhood type

Finally, table 35 shows the average KS4 point score and percentage of pupils achieving five A*-C by length of distance moved. Using Clark and Huang (2003) distance categories, short distance moves are classed as any move less than 30 miles (50km) and a long-distance move are classed as a move greater than 30 miles (50km). Table 37 shows that those that move short distances score on average 12 KS4 points less than those that do not move and 25 points less than those that move long distances. Those that move long distances score seven points more than those who do not move. Those that move both short and long distances score on average 30 points less than those who do not move and 12 points less than those that only move short distances.

The reason for long distance moves having the highest average point score and percentage achieving five A*-C could be linked to socio-economic reasons. It might reasonably be expected that moving further may have more of a negative impact on children who will likely have to adapt to a new school and new residential environment which will cause a greater disruption. However, as Clark and Huang (2003) highlight long-distance moves are primarily associated with employment opportunities and are often linked to professionals, whereas shorter distances moved are generally influenced by the housing market or local disruption to a family. This means that those moving long distance are more likely to be moving for a new job, to better their circumstances (Rossi, 1955), which may have an influence on KS4 results if a child is attending a better school for example. Those moving shorter distances are more likely to be moving due to temporary and unstable housing as highlighted in chapter 4.

Number of moves	No Distance (No move)	Short distance only (<30miles)	Long distance only (>30 miles)	Short and Long distances
KS4 point score	288	270	295	258
Achieved five A*-C	50.7	49.9	57.4	45.0

Table 35: Table 35: Average KS4 point scores and percentage achieving five A*-C by distance moved

The analyses so far suggest that there is an association with GCSE results and the number of LSOA and school moves, as well as by ethnicity, FSM eligibility and neighbourhood type. However, the analyses so far have merely showed the average point score and range of the data and do not account for the significance of the data. More robust analysis is therefore required. The next section will evaluate a series of regression models using KS4 scores as the dependent variable and control for LSOA and school moves along with individual characteristics and variables associated with moving.

7.4 The association between moving and educational attainment

A series of linear (KS4 point score) and logit (five A*-C) regression models are run to test if there is an association with moving an educational attainment. All models use clustered robust standard errors, accounting for clustering of data at the LSOA level, accounting for the fact that individuals in the same residential areas tend to be similar. Cluster robust standard errors tell the model that clusters exist in the data and where they are so that it can correctly account for them.

Table 36 presents the linear regression output showing the relationship between LSOA moves and school moves with KS4 point scores. The model shows that pupils who just move LSOA, pupils who just move school and pupils who move both LSOA and school during the same year. The model uses no moves as the baseline in order to analyse the difference each additional move has on educational attainment compared to those who do not move. With each additional LSOA move, KS4 point scores decrease, indicating that the more a pupil moves home during the educational life course the lower their KS4 point score will be on average. Pupils who move five or more times will score 55 points less than a pupil who never moves on average. In terms of GCSEs the average pupil who never moves would score 297 points (as shown by the constant) which is equivalent to achieving four Cs and four Ds. The average pupil who moves LSOA five or more times would score 242 points which is equivalent to five Ds and three Es.

In terms of moving school only, moving school once does not have a negative association with KS4 point scores. In fact, those that move school once do marginally better in terms of point scores (3.2 more points on average) compared with those who never move. This may be due to that fact that all pupils make a transitionary move at least once during the educational life course and moving without classmates at these specific times may not have a negative impact on educational attainment as expected considering the literature suggests that one of the biggest anxieties about moving school without fellow peers is having to make new friends (Galton, 2010; Weller, 2006). It may also be an example of school choice working, where people are moving school in order to improve their education.

Moving only school two or more times during the educational life course, however, does have a negative association with KS4 point scores, with each additional school move resulting in lower KS4 point scores. Pupils who move school five or more times score 80 points less on average than those who never move school. This would be the equivalent of getting eight Es at GCSE, compared to the average pupil who never moved school. Moving school once or twice does not have as much of a negative association with KS4 point score as moving LSOA the same number of times, however moving school 3 or more times, has more of a negative association on KS4 point score than moving LSOA the equivalent number of times, suggesting that multiple local school moves has more of a negative association with educational attainment than multiple LSOA moves. Pupils that move both LSOA and school during the same year have the lowest KS4 points on average, this is to be expected as pupils will have the combined disruption of moving both home and school. By four or more LSOA and school moves during the same year, the effect is the same for those who only move school four or more times, suggesting that frequent local school moves are just as disruptive as moving both home and school. It is likely that moving school frequently will be due to an issue at the school, either the pupil

disliking the school or being expelled from the school, which is likely to cause disruption to their education.

KS4 points	Coef.	CR Std. Err.	P Value	95% Conf Interval	
LSOA Moves Reference: 0					
1	-10.31	0.33	<0.01	-11.06	-9.56
2	-25.88	0.45	<0.01	-27.02	-24.74
3	-37.02	0.63	<0.01	-38.89	-35.16
4	-47.59	1.01	<0.01	-50.93	-44.25
5+	-55.68	1.49	<0.01	-61.15	-50.22
School Moves Reference: 0					
1	3.20	0.42	<0.01	2.55	3.85
2	-33.03	0.73	<0.01	-34.39	-31.66
3	-69.83	1.89	<0.01	-73.75	-65.91
4	-96.22	5.59	<0.01	-108.14	-84.29
5+	-127.93	15.81	<0.01	-161.95	-93.91
LSOA & School Moves Reference: 0					
1	-17.42	0.38	<0.01	-18.33	-16.52
2	-49.81	0.66	<0.01	-51.62	-48.00
3	-74.15	1.05	<0.01	-77.59	-70.73
4	-97.29	1.67	<0.01	-103.59	-90.98
5+	-125.84	2.35	<0.01	-136.58	-115.10
cons	296.77	0.41	<0.01	296.25	297.30

Table 36: Model 1- Linear Regression output of LSOA, school moves and LSOA & school moves with KS4 point scores using cluster robust standard errors based on LSOAs.

Table 37 focuses on only LSOA and School moves in relation to KS4 point score and explains just over 3% of the variance. It is therefore necessary to control for other individual factors before drawing conclusions about the association between mobility and educational attainment. Table 39 includes the output of four models, all controlling for LSOA and school moves, adding more independent variables in each additional model. Model 2 controls for gender, and ethnicity. Model 3 then adds FSM eligibility. Model 4 adds school quality; this variable was calculated by taking the average KS4 point score for each school attended by pupils in the NPD cohort. These scores were then put into quintiles, with 5 having the highest point score and 1 having the lowest point score. Model 5 adds Key Stage 2 (KS2) as a marker of prior attainment, which are the scores are based on English, maths and science tests taken at age 11 during the final year of primary school.

Model 5 shows that when controlling for gender, ethnicity, FSM eligibility, school quality and prior attainment, moving LSOA still has a negative association with educational attainment, with each additional LSOA move decreasing KS4 point score although the coefficients have reduced to almost a third of that in model 2. Those moving five or more times score on average almost twenty KS4 points less than those who never move. The coefficients for school moves have also decreased in model 5 compared to model 2. Moving school two or more times however still has a negative association with KS4 points score. Those that move school five or more times, score on average 65 points less than pupils who never move school. In model 5 those that move school two or more times on average score lower points than those who move both school and LSOA during the same year.

In all four models, boys score lower KS4 point scores on average than girls, when controlling for prior attainment at KS2 the gap narrows slightly. However, in model 5 there is still a difference of 23 points. The four models show that with the exception of Gypsy and Traveller pupils, all ethnic minority groups on average, score higher overall KS4 points compared to White British pupils, suggesting that in all cases White British pupils score disproportionately lower points, even though some ethic minority groups such as Black African and Black Caribbean pupils move LSOA and school more. In all models, Chinese pupils score the highest KS4 point score on average, followed by Pakistani and then Bangladeshi pupils. Strand (2014) also found that all ethnic minority groups achieve at least as well as, and frequently substantially better than, the White British students at age 16.

Adding FSM eligibility to the model causes the biggest change in coefficients for each ethnic minority group. There is a large difference between model 2 and 3 for Bangladeshis. Prior to controlling for FSM, the average KS4 point score is much lower at 18.59 compared to 53.5 and there is also a noticeable difference for Black Caribbean pupils. In model 2 the average KS4 point score for Black Caribbean pupils is 12.37 compared with model 3 where it is 36.67. The inclusion of FSM eligibility has little influence on the average scores for Indian, Chinese and Pakistani pupils. There is a large difference between the two models for Bangladeshis. When not controlling for FSM the average KS4 point score is much lower at 18.59 compared to 53.5 there is also a noticeable difference for Black Caribbean pupils; in model 2 the average KS4 point score is 12.37 compared with model 3 where it is 36.67. The coefficient for Gypsy and Traveller pupils almost halves when FSM eligibility is controlled for.

In all models, FSM eligibility is associated with KS4 point scores. In model 3, before controlling for school quality and prior attainment, those eligible for FSM each year across the educational life course score on average 110 points less than a pupil who has never been eligible. In the final model this is reduced to almost 47 points less. In all models, pupils being eligible for FSM for only one year, score lower KS4 points on average than those who have never been eligible for FSM. A change in

circumstances for just one year can therefore have a negative association with educational attainment.

Model 4 also controls for school quality. Those in schools in the lowest decile in terms of school quality, score on average 114 KS4 points less than those in the best schools in quintile 5. Model 5 additionally controls for KS2 scores in order to see how prior attainment influences KS4 point scores when controlling for LSOA and school moves. With each additional point scored at KS2, KS4 points increase by just over 6.5 points. Doing well at age 11 is therefore a strong predictor of doing well at KS4. Including KS2 scores reduces the coefficients for school quality, however those in the schools in the lowest quintile in terms of quality score over 82 points less at KS4 compared to those in one of the best schools in terms of quality, which is the difference between the average pupil getting in one of the best schools getting three As and five Bs at GCSE compared with the average pupil in the lowest quality school getting five Cs and 3 Ds.

KS4 point scores	Model 2	Model 3	Model 4	Model 5
LSOA moves Reference: 0 moves				
1	-10.44** (0.33)	-5.06** (0.30)	-3.96** (0.28)	-3.65** (0.22)
2	-25.81** (0.44)	-13.77** (0.41)	-11.90** (0.38)	-9.25** (0.31)
3	-36.62** (0.62)	-19.72** (0.59)	-17.14** (0.55)	-12.62** (0.45)
4	-47.15** (0.99)	-26.52** (0.94)	-22.97** (0.87)	-19.04** (0.73)
5+	-55.27** (1.46)	-31.61** (1.37)	-26.72** (1.29)	-19.71** (1.07)
School Moves Reference: 0 moves				
1	0.51 (0.42)	3.60** (0.37)	1.8** (0.29)	0.59** (0.23)
2	-35.55** (0.72)	-23.20** (0.65)	-20.25** (0.59)	-11.63** (0.49)
3	-72.41** (1.84)	-50.36** (1.76)	-44.20** (1.70)	-25.25** (1.54)
4	-98.56** (5.48)	-69.72** (5.22)	-59.11** (5.13)	-34.58** (4.80)
5+	-126.61** (15.34)	-100.82** (14.44)	-87.36** (13.79)	-65.20** (12.48)
LSOA & School Moves Reference: 0 moves				
1	-19.12** (0.38)	-8.22** (0.35)	-7.33** (1.22)	-2.58** (0.26)
2	-51.48** (0.64)	-24.32** (0.61)	-20.15** (0.24)	-8.99** (0.49)
3	-75.08** (1.03)	-37.37** (0.98)	-30.89** (0.46)	-14.11** (0.89)
4	-97.11** (1.64)	-51.76** (1.57)	-45.95** (0.84)	-20.60** (1.53)
5+	-124.20** (2.33)	-73.20** (2.22)	-64.51** (1.42)	-30.00** (2.52)
Gender Reference: Girls				
Boys	-30.14** (0.29)	-30.60** (0.27)	-28.65** (0.08)	-23.05** (0.20)
Ethnic Group Reference**:** White British				
Bangladeshi	18.22** (1.56)	53.13** (1.67)	44.59** (1.22)	42.18** (0.93)

Black African	11.53** (1.26)	10.18** (1.19)	15.08** (0.91)	21.54** (0.72)
Black Caribbean	12.21** (0.86)	36.63** (0.84)	24.12** (0.76)	26.78** (0.60)
Chinese	92.78** (2.02)	87.09** (2.03)	74.39** (1.94)	52.75** (1.44)
Indian	49.92** (1.08)	47.61** (1.00)	36.96** (0.88)	31.85** (0.61)
Mixed	11.03** (0.81)	25.03** (0.73)	17.59** (0.66)	10.94** (0.53)
Other	21.49** (1.11)	40.72** (1.09)	27.38** (0.96)	26.11** (0.78)
Pakistani	65.38** (1.57)	71.48** (1.48)	54.78** (1.34)	43.86** (0.98)
White Other	36.50** (1.01)	44.74** (0.95)	28.80** (0.85)	24.61** (0.67)
Traveller Gypsy	-103.52** (5.29)	-62.39** (5.04)	-63.89** (4.80)	-26.77** (4.83)
FSM eligibility: Reference: No FSM				
1 year		-54.50** (0.68)	-39.36** (0.63)	-24.48** (0.50)
2-4 years		-67.20** (0.51)	-48.73** (0.47)	-30.14** (0.38)
5-7 years		-83.64** (0.60)	-60.99** (0.55)	-37.24** (0.46)
8-10 years		-104.82** (0.65)	-78.33** (0.58)	-46.71** (0.50)
11 years		-110.27** (0.81)	-80.71** (0.72)	-46.72** (0.60)
School Quality: Reference: best (5)				
4			-31.23** (0.39)	-19.27** (0.30)
3			-50.98** (0.41)	-33.60** (0.33)
2			-73.11** (0.43)	-50.83** (0.35)
1			-114.14** (0.48)	-82.24** (0.42)
KS2 points				6.53** (0.02)
cons	311.58** (0.44)	325.84** (0.37)	373.28** (0.35)	384.41** (0.32)
R2	0.07	0.18	0.27	0.56

Table 37: Model 2-5 - Linear Regression output of KS4 point scores, controlling for LSOA moves, school moves, gender, ethnicity, FSM eligibility, school quality and prior attainment using cluster robust standard errors.

The models so far have used KS4 point scores as the dependent variable. In order to test whether a similar relationship is found when five A*-C is inputted as the dependent variable in a regression model, the previous analyses is re run as logit models using five A*-C as the dependent variable. Although KS4 point scores are a good indicator of how well a pupil has done at GCSE or equivalent overall, achieving five A*-C is seen as a benchmark, so it is also important to test the association between moving and educational attainment using this as the dependent variable.

Table 38 is a logit regression model showing the relationship between LSOA moves, school moves, and LSOA and school moves with the odds of pupils achieving five A*-C at GCSE (KS4). The model as expected shows the same pattern as that outlined in table 36 with KS4 points as the dependent variable. The odds of achieving five A*-C decrease with every additional LSOA move. The odds of

getting five A*-C are slightly higher for those that move school once, but after that decrease with every additional school move. The odds of getting five A*-C are overall lower for those that move both LSOA and school during the same year.

(Model 6) Achieved five A*-C	Odds Ratio	CR Std. Err.	P Value	95% Conf. Interval	
LSOA Moves Reference: 0					
1	0.85	0.01	<0.01	0.84	0.87
2	0.69	0.01	<0.01	0.67	0.70
3	0.58	0.01	<0.01	0.56	0.60
4	0.50	0.02	<0.01	0.47	0.53
5+	0.45	0.02	<0.01	0.40	0.50
School Moves Reference: 0					
1	1.06	0.01	<0.01	1.04	1.07
2	0.64	0.01	<0.01	0.63	0.66
3	0.37	0.01	<0.01	0.35	0.40
4	0.24	0.03	<0.01	0.18	0.31
5+	0.24	0.09	<0.01	0.12	0.51
LSOA & School Moves Reference: 0					
1	0.76	0.01	<0.01	0.75	0.77
2	0.47	0.01	<0.01	0.45	0.48
3	0.33	0.01	<0.01	0.31	0.35
4	0.22	0.02	<0.01	0.19	0.26
5+	0.12	0.02	<0.01	0.09	0.16
cons	1.47	0.01	<0.01	1.46	1.49

Table 38: Model 6 – Logit Regression output of LSOA, school moves and LSOA & school moves with odds of achieving five A*-C using cluster robust standard errors.

The analyses are repeated using a logit regression with achievement of five A*-Cs the dependent variable (output shown in table 42 Appendix 10.3). One interesting difference is that the first model shows that when FSM eligibility is not controlled for the odds of Black African pupils achieving five A*-C is lower than that of White British pupils, however when FSM is controlled for the odds are then greater, meaning Black African pupils not in receipt of FSM achieve a lower chance of five A*-C than White British pupils who are not in receipt of FSM.

7.5 The association between neighbourhood type and educational attainment

This thesis is also interested not only in number of moves, but also type of moves. The next model (shown in table 39) is specifically focused on the effect neighbourhood type has on KS4 results. These

models are being run separately from LSOA and school moves as the interest is specifically on the impact neighbourhood type has on educational attainment. Model 7 (table 39) shows that pupils moving between the most deprived neighbourhoods score the lowest average KS4 point scores compared pupils living or moving between all other neighbourhood types. The average pupil moving between the most deprived neighbourhoods scores almost 111 KS4 points less than the average pupil living in one of the least deprived neighbourhoods having never moved. This is the difference between the average pupil living in the least deprived neighbourhood having never moved getting three Bs and five Cs at GCSE, with the average pupil moving between the most deprived neighbourhoods getting eight Es at GCSE. The next group to score the lowest KS4 point score on average are those pupils that live in the same deprived neighbourhood throughout the educational life course and never move, scoring almost 87 points less than those living in the same least deprived neighbourhood throughout the educational life course.

Pupils who move between the least deprived neighbourhoods score 8.5 points less on average than those who stay in one of the least deprived neighbourhoods but never move. There is also 22 KS4 points difference between those that move between the neighbourhoods classed as mid in terms of level of deprivation and those that stay in this type of neighbourhoods across the educational life course and never move. It is clear therefore in all cases that movers who circulate in neighbourhood types always appear to do worse than those pupils who stay in the same type of neighbourhood throughout the educational life course. The regression output also highlights how living in a more deprived neighbourhood during the educational life course has the greatest negative association with educational attainment compared to those that live or move between the least deprived neighbourhoods.

Those pupils who do upgrade neighbourhoods considerably and move from one of the most deprived to one of the least deprived neighbourhoods score higher at KS4 than a pupil who moved between the most deprived neighbourhoods, therefore highlighting upgrading can have a benefit. However, having lived in the deprived neighbourhood for some of the educational life course has a negative effect as moving from high to low still scores over 50 points less than those pupils who move between the most affluent neighbourhoods. This may be because although pupils now live in a less deprived neighbourhood, they have not recovered from the early disadvantage they experienced in their previous neighbourhood (Glass and Bilal, 2014). Those who downgrade neighbourhoods considerably and move from one of the least deprived neighbourhoods to the most deprived, score over 74 points less at KS4 compared to those who have lived in the same affluent neighbourhood throughout the

educational life course. Again, this may signal a change in socio-economic circumstances and indicate a move due to negative circumstances (Coulton et al, 2012) which is likely to cause some chaos to a pupil's life and therefore negatively impact on their educational attainment. However, it is necessary to highlight that these pupils still score higher overall points at KS4 compared to those who have moved between or lived in the same deprived neighbourhood throughout the educational life course, so there is a benefit to upgrading neighbourhood. The analyses indicate that beginning the educational life course living in one of the most deprived neighbourhoods reduces attainment at KS4, however living in one of the least deprived neighbourhoods at the beginning of the educational life course does not guarantee higher point scores at KS4 if moving to a more deprived neighbourhood later on.

(model 7) ks4 point score	Coef.	CR Std. Err.	P value	95% Conf. Interval	
High > high (move)	-110.98	0.72	<0.01	-112.38	-109.57
Mid>High (move)	-92.93	0.83	<0.01	-94.55	-91.31
High > high (stay)	-86.68	0.73	<0.01	-88.12	-85.25
High>Mid(move)	-82.44	0.71	<0.01	-83.83	-81.05
Low > High (move)	-74.21	1.49	<0.01	-77.13	-71.29
High > Low (move)	-60.37	0.94	<0.01	-62.20	-58.54
Mid > Mid (move)	-58.59	0.65	<0.01	-59.87	-57.30
Mid >Mid (stay)	-36.86	0.62	<0.01	-38.08	-35.64
Low>Mid (move)	-33.66	0.74	<0.01	-35.12	-32.21
Mid>Low (move)	-31.31	0.64	<0.01	-32.56	-30.07
Low > low (move)	-8.51	0.54	<0.01	-9.58	-7.44
_cons	337.99	0.42	<0.01	337.15	338.81

Table 39: Model 7: Linear regression of KS4 point scores, controlling for neighbourhood type using cluster robust standard errors

Model 7 (table 39) only explains 5% of the variance as it does not control for any other individual factors. Model 8 (table 40) controls for gender, ethnicity and also distance travelled. The coefficients increase slightly in model 8 compared with model 7, however once FSM eligibility is controlled for in model 9 the coefficients decrease, as expected as FSM is a marker of socio-economic status which is associated with neighbourhood type. Both models continue to show that those moving between the most deprived neighbourhoods score the lowest average KS4 point scores compared pupils living or moving between all other neighbourhood types.

Both models show that, when controlling for neighbourhood type, all ethnic minority groups score higher KS4 points on average compared to White British pupils other than gypsy and traveller pupils

who score the lowest KS4 points on average. Again, in a similar to the pattern shown in previous models FSM eligibility has a negative association with KS4 point scores, with those eligible for FSM each school year across the educational life course, scoring on average 85 points less than those who have never been eligible. Both models show that those who move longer distances achieve a higher point score than those who do not move at all, which reinforces the premise earlier that those moving further distances are more likely to be moving to better their circumstances by moving for a new job (Clark and Huang, 2003) which may mean a better school which has shown to have a positive influence on educational attainment. Those that move short distances only do marginally worse at KS4 than those who never move. Those that move short and long distances, in the case of model 9 score six points less at KS4 than those who never move, this is likely to be because the pupil will move at least twice, which as shown in model 1 has a negative association with KS4 point score.

	Model 8		Model 9	
KS4 point score	Coef.	CR Std. Err.	Coef.	CR Std. Err.
Neighbourhood Type Reference: Low>Low (stay)				
High > high (move)	-121.53**	0.68	-80.03**	0.67
High > high (stay)	-96.21**	0.71	-69.43**	0.67
High > low	-65.51**	0.92	-48.77**	0.88
High>Mid(move)	-90.18**	0.69	-64.06**	0.67
Low > high	-75.95**	1.48	-56.62**	1.41
Low > low (move)	-8.51**	0.55	-6.00**	0.54
Low>Mid (move)	-34.07**	0.74	-26.22**	0.72
Mid > Mid (move)	-61.80**	0.65	-46.59**	0.62
Mid >Mid (stay)	-39.41**	0.61	-32.94**	0.58
Mid>High (move)	-98.69**	0.82	-69.11**	0.79
Mid>Low (move)	-33.07**	0.64	-26.08**	0.61
Gender Reference: Girl				
Boy	-30.46**	0.27	-30.74**	0.26
Ethnic Group Reference: White British				
Bangladeshi	60.21**	1.54	74.10**	1.67
Black African	25.46**	1.14	30.93**	1.13
Black Caribbean	45.02**	0.87	54.01**	0.85
Chinese	95.27**	2.11	90.45**	2.12
Indian	67.90**	1.04	61.04**	1.00
Mixed	23.44**	0.76	30.95**	0.72
Other	39.10**	1.11	48.96**	1.12
Pakistani	79.67**	1.53	80.94**	1.48
White Other	44.97**	0.97	49.16**	0.97

Traveller Gypsy	-99.86**	5.42	-67.93**	5.16
Distance Moved Reference: No distance (no move)				
Short distance only (<30 miles)	-0.67**	0.46	-1.09**	0.43
Long distance only (>30 miles)	13.22**	1.65	9.91**	1.58
Short and Long distance	-14.19**	1.06	-6.00**	1.01
FSM eligibility Reference: 0 years				
1 year			-43.24**	0.67
2-4 years			-53.31**	0.50
5-7 years			-66.70**	0.58
8-10 years			-84.77**	0.62
11 years			-85.18**	0.77
cons	350.55**	0.44	353.98**	0.42

Table 40: Models 8 & 9 - Linear Regression output of KS4 point scores, controlling for neighbourhood type, gender, ethnicity, distance moved and FSM eligibility using cluster robust standard errors

The models are re run using five A*-C as the dependent variable. As expected, the odds of achieving five A*-C are lower for all neighbourhood types compared to those living in one of the least deprived neighbourhoods and not moving across the educational life course (as shown in table 41). The odds of achieving five A*-C are lowest for those moving between the most deprived neighbourhoods.

(Model 10) Achieving five A*-C	Odds Ratio	CR Std. Err.	P value	95% Conf Interval	
IMD					
High > High (move)	0.20	0.00	<0.01	0.20	0.21
High > High (stay)	0.28	0.00	<0.01	0.28	0.29
High > Low (move)	0.38	0.01	<0.01	0.37	0.39
High>Mid(move)	0.29	0.00	<0.01	0.28	0.30
Low > High (move)	0.32	0.01	<0.01	0.30	0.34
Low > Low (move)	0.83	0.01	<0.01	0.81	0.85
Low>Mid (move)	0.55	0.01	<0.01	0.54	0.57
Mid > Mid (move)	0.39	0.00	<0.01	0.38	0.40
Mid >Mid (stay)	0.55	0.01	<0.01	0.54	0.57
Mid>High (move)	0.25	0.00	<0.01	0.24	0.26
Mid>Low (move)	0.58	0.01	<0.01	0.56	0.59
cons	2.75	0.03	<0.01	2.70	2.80
R2 0.05					

Table 41: Model 10: Logit regression of KS4 point scores, controlling for neighbourhood type using cluster robust standard errors.

The final two models (as shown in table 43 in Appendix 10.3) repeat the analyses shown in table 39, this time using a logit regression, as the dependent variable are pupils achieving five A*-C. The two models control for gender, ethnicity and distance moved, with model 16 also controlling for FSM

eligibility. The odds of achieving five A*-C increase slightly for all neighbourhood types once FSM eligibility is controlled for. The odds of achieving five A*-C increase significantly for Bangladeshi pupils and interestingly stay the same for Black Caribbean pupils when FSM is controlled for, suggesting that there is no difference in achievement of five A*-C at GCSE whether a Black Caribbean pupil is eligible for FSM or not. All ethnic groups have higher odds of achieving five A*-C than White British pupils. The odds of achieving five A*-C drops significantly for pupils that have only been eligible for FSM for only one year and for those who have been eligible for eight or more years the odds are much lower again.

7.6 Conclusion

This chapter has demonstrated that there is an association between moving LSOA and moving school on educational attainment. Moving LSOA only once has a negative association with KS4 point scores and with each additional LSOA move, KS4 point scores decrease and likelihood of achieving five A*-C also decreases. Moving school once does not have a negative association with educational attainment, however moving school two or more times has a negative association and the more a pupil move school the lower their KS4 point score or likelihood of achieving five A*-C decreases.

Although in previous chapters Black African pupils have been found to move LSOA the most and Black Caribbean pupils move school the most, both groups do not score the lowest KS4 point scores or have the lowest odds of achieving five A*-C at GCSE. Gypsy and Traveller pupils score the lowest points, closely followed by White British pupils. Ethnic minority groups on the whole tend to do better at KS4 compared to White British pupils. This therefore suggests that White British pupils score disproportionately lower KS4 points and odds of achieving five A*-C compared with ethnic minority groups who move the same number of times. However, it is important to highlight that White British pupils are a very heterogeneous group; therefore, difference is mostly composition rather than an effect of moving. Chinese pupils having the highest odds of achieving five A*-C and the highest overall KS4 points score.

Pupils eligible for FSM, even if for only one-year score lower KS4 point score than pupils who have never been eligible. Pupils who have been eligible for FSM every school year score the lowest points at KS4 and are least likely to achieve five A*-C. When controlling for school quality, those that attended a school in the quintile 1, which contained the best schools, on average scored the highest overall KS4 point scores and achieved the highest percentage of five A*-C. Those that did better at KS2 on average scored the highest KS4 points, showing that good school quality and prior attainment were strong predictors of results at KS4.

In terms of neighbourhood type, those that move between the most deprived neighbourhoods score the lowest KS4 points on average and have the lowest odds of achieving five A*-C. The next group after this are those pupils that live in the same deprived neighbourhood throughout the educational life course. This highlights that pupils exposed to deprived neighbourhoods throughout the whole of the educational life course have the lowest educational attainment compared those who may only be exposed for a short period or not at all (Van Ham and Manley, 2012).

Families who do manage to upgrade neighbourhood considerably, moving from one of the most deprived to the least deprived neighbourhoods still score much lower KS4 point scores on average than those living in one of the least deprived neighbourhoods throughout the educational life course but do score slightly higher than those who have always lived in deprived neighbourhood. Living in a deprived neighbourhood for only a short period of time can still have a negative association with educational attainment, even if that person then lives in a more affluent neighbourhood when taking exams.

Those moving between similar types of neighbourhood (i.e. high to high, mid to mid, and low to low) always do worse at KS4 than those living in the same neighbourhood throughout life course (i.e. high, mid and low), suggesting that the mobility element has a negative association with educational attainment, above and beyond solely the neighbourhood type in which a pupil lives. Pupils who move long distance score a slightly higher number of points at KS4 compared to those who never move, with a possible explanation being that longer moves are more commonly associated with a new job or employment opportunity. This is likely to mean the move is brought about by a positive reason for moving, to better circumstances, which may then have an influence on educational outcomes.

Pupils who attend the schools of high quality in the top quintile, score higher KS4 points and have higher odds of achieving five A*-C than those who go to one of the lowest quality schools in the bottom quintile. Prior attainment is also a strong predictor of how well a pupil will do at KS4, as those scoring higher at KS2 are predicted to score higher at KS4.

Even when controlling for all additional individual characteristics such as gender, ethnicity, FSM eligibility, school quality and prior attainment, moving LSOA still has a negative impact on educational attainment, with two or more school moves also having a negative association, in both cases with each additional move KS4 point scores decrease and likelihood of achieving five A*-C also decreases. Overall, moving school has more of a negative association with education attainment compared to moving LSOA.

Chapter 8: Conclusion

8.1 Overview

While there has been a wealth of literature outlining the impact residential and school mobility has on a range of social, health and educational factors, there has been limited research carried out where both mobilities have been studied together and where it has, studies have been either cross sectional or where longitudinal have used data large aggregate geographical scales.

This thesis has demonstrated a method of understanding processes of residential and school mobility across the educational life course using longitudinal data. Through an analysis of a series of case studies and links to current and previous academic literature, this thesis has shown that there are differences in mobility patterns among ethnic and social groups across time and space. This thesis has also added a spatial element to mobility research, not only highlighting which social and ethnic groups are moving but also the type of move they are making, whether this be to a better or worse neighbourhood in terms of deprivation or to an ethnically concentrated area to the origin neighbourhood. The results have been linked to educational attainment, finding that both residential and school mobility have a negative association with KS4 point scores and the odds of achieving five A*-C at GCSE.

The use of case studies has enabled a big dataset to tell small stories. Studying a specific ethnic group within a geographical area, has allowed for patterns of residential and school mobility to be better understood and findings can be linked to previous and current literature to take analysis one step further to give an indication of why certain groups are moving both home and school.

8.2 Key Contributions to the literature

The aim of chapter 4 was to evaluate whether certain social and ethnic groups have more of a propensity to move home than others. The key findings for this chapter was that Black African pupils move LSOAs the most, one of the main possible reasons put forward for this was because Black African pupils rely much more heavily on social housing and private rentals (Lancaster and McCarthy, 2014). Privately rented housing can be very unstable with short fixed term tenancies that are not guaranteed to be extended (Lancaster and McCarthy, 2014). The majority of Black African pupils within the NPD cohort live in inner city areas such as London where house prices are higher, meaning renting is often the only option available, compared to Indian pupils (who have much lower odds of moving LSOAs than Black African pupils) who predominantly live in owner occupied housing, which provides more stability than renting.

Chapter 4 also included a case study of Bangladeshi pupils living in Tower Hamlets, to provide a more in depth understanding of residential mobility patterns at a smaller geographical scale. The analyses showed that Bangladeshi pupils tend to move within the same Local Authority, and if they do leave Tower Hamlets they generally move to neighbouring areas with a similar ethnic and social profile to their neighbourhood of origin. Linking this to previous and current literature, it was thought this may be because of socio-economic reasons, in that housing in only certain areas was affordable which would often be in neighbouring areas, that ethnic groups were more discriminated in other areas and therefore felt more comfortable living near their origin neighbourhood, or because they liked the community they were living in and therefore wanted to stay nearby. Chapter 4 outlined that there were many different types of residential moves which was then explored further in Chapter 5.

It was clear from the case study that the majority of Bangladeshi pupils living in Tower Hamlets when moving, moved to the same type of neighbourhood in terms of their social and ethnic profile. This highlights that pupils were neither upgrading nor downgrading neighbourhood and were trying to find a similar location to that of their origin neighbourhood, either within the same Local Authority or nearby. This may solely be down to choice, with families wanting to move to similar areas because they like the community and local environment, however this could also signal that the move is not through choice and linking to current literature, either due to a forced move or because of unstable housing, with families not wanting to leave their home and therefore finding new accommodation as close to their origin neighbourhood as possible, which suggests that the act of moving was causing a problem rather than dissatisfaction with the origin neighbourhood or being 'stuck in place'.

Following on from chapter 4 and prompted by the Bangladeshi case study, the aim of chapter 5 was to evaluate types of move by ethnicity, socio-economic status and geography. Using the IMD to compare the level of deprivation between origin and destination neighbourhood meant it was possible to analyse whether pupils were able to upgrade or downgrade neighbourhood. Finding that very small numbers are able to upgrade considerably, with the majority staying in the same type of neighbourhood, the case study of London highlighted that one possible reason for the difficulty in upgrading neighbourhood in London is due to lack of affordable housing. The majority of Black African and Bangladeshi pupils live in or move between the most deprived neighbourhoods.

Black Caribbean and Pakistani pupils move the shortest distances on average. Those eligible for FSM every school year and those moving between the most deprived neighbourhoods moved the shortest distances on averaging, suggesting a link between lower socio-economic status and short residential moves, which corresponds with previous research (Cooke, 2010). A case study of London outlined that ethnic minority groups generally move to neighbourhoods with similar ethnic concentrations to origin neighbourhood or to areas that are slightly more mixed. White British pupils living in London however,

moved on average to neighbourhoods that were less ethnically diverse than their origin neighbourhood. Some authors would argue this was 'White avoidance' whereas others argue it is moving out of more deprived areas or poor-quality schools rather than being based on any kind of prejudice towards ethnic groups and instead neighbourhood socio-economic characteristics being masked by racial considerations (Dekker, 2013; Harris, 2001).

The aim of chapter 6 was to evaluate whether certain social and ethnic groups have a greater propensity to move school than others. The key findings for this chapter was that Black Caribbean pupils move school the most. By including a case study of Black Caribbean pupils in Lambeth and linking results to current literature a likely reason put forward for this was linked to geography and school choice. The majority of Black Caribbean pupils live-in inner-city areas where demand for the same schools is higher, meaning pupils especially in London, do not get their first choice. This means it is more likely that pupils will move to secondary school without classmates and then make subsequent moves to reposition themselves in the schools as they become available. Pupils living in rural areas, are more likely to get their first choice of secondary school. The majority of Black Caribbean pupils especially living in London, live in the most deprived neighbourhoods with lower-socio economic status meaning the potential to move to be closer to better in not able to work the system as in rural areas, less demand, able to move. In London many do not have the financial capabilities to do so.

Finally, the aim of chapter 7 was to bring all previous analytical chapters together to evaluate the impact moving both LSOA and school has on educational attainment, using KS4 point scores and number achieving five A*-C as the main outcome variables. The key finding for this chapter that moving LSOA has a negative association with education attainment, with each additional move further decreasing point scores and odds of achieving five A*-C. Moving school once does not have a negative impact however moving school two or more times does have a negative association with KS4 point scores and odds of achieving, with school moves having more of a negative association with educational attainment than moving LSOA. Other than Gypsy/Traveller pupils, White British pupils on average score the lowest KS4 point score and have the lowest percentage achieving five A*-C.

The other aim of chapter 7 was to outline how the moves between type of neighbourhood is associated with educational attainment. Pupils who move between the most deprived neighbourhoods score the lowest KS4 points and have the lowest odds of achieving five A*-C at GCSE. Those moving between neighbourhoods always scored lower than the children who live in the same neighbourhood throughout the educational life course, highlighting the fact that the act of moving itself has a greater negative impact than staying in the same place, therefore reinforcing the idea of being 'stuck in *type* of place' being the issue rather than simply just 'stuck in place'. Pupils who do

upgrade neighbourhoods from most deprived to least deprived, score slightly higher KS4 points than those who only move between deprived neighbourhoods but still do not catch up with those who have lived in one of the least deprived neighbourhoods throughout the educational life course, therefore reinforcing that idea that living in a deprived place for only a short amount of time will have a negative association with educational attainment.

8.3 Research and policy implications

This thesis has demonstrated, in terms of neighbourhood, the focus should not solely be on pupils who are 'stuck in place' but instead pupils who are 'stuck in *type* of place', as this has one of the biggest associations with mobility and negative impact on educational attainment and also considers pupils who are mobile. Pupils that remain in the same deprived neighbourhood throughout school and never move do on average better at GCSE than those that have moved between deprived neighbourhoods. This therefore needs to be considered when studying the inequalities of educational attainment, as currently there is little focus on how moving, which is especially problematic for families in unstable housing or those in experiencing economic hardship is impacting on education. It is not purely a case of where you live determining your outcomes (Pribesh & Downey, 1999), but also how often you move home during childhood and adolescence. It is not necessarily the movement per se that is the problem but the circumstance of those who are deprived and most mobile. Mobility could be acting as a proxy for unmeasured home and family circumstances, for example.

The Tower Hamlets case study in chapter 4, reported that when families moved, the majority moved to nearby neighbourhoods within the same LA or neighbouring LAs with similar housing tenure and socio-economic profiles. Highlighting that families remain in the same type of place. The results in chapter 7 shows that moving between the same type of neighbourhood has more of an impact on educational attainment than staying in the same neighbourhood throughout the educational life course. This is clearly a policy issue that needs to be addressed considering that one of the main possible reasons for moving was found to be unstable and poor-quality housing in Tower Hamlets. It has been found that pupils are better to stay in a neighbourhood than to move, so there is a need for poor quality housing to be addressed to stop unnecessary moving which as shown can be disruptive to education.

Analyses and links to previous literature has found that higher rates of residential mobility tend to be found in inner city areas, especially in London, among lower socio-economic groups, often due to unstable housing and increasing rents. A study carried out by Shelter in 2017 found that typical new homes built today are out of reach for eight in ten working private renting families across the country,

even if they use the Government's Help to buy scheme. Without more affordable housing families' only option will be to rent which is less secure (Shelter, 2017).

The Local Government Association (2017) stated that councils are providing temporary housing for approximately 120,540 children and their families. Temporary housing provides little stability as a family may have to move at any time. Placement in temporary accommodation, is often at a distance from previous support networks and can lead to individuals and families falling through the net and becoming disengaged from health, education, social care and welfare support systems (HM Government, 2010). Families may have to live in bed and breakfasts for a number of weeks while housing is found, and when they are found housing it is not guaranteed they can stay permanently. This thesis has highlighted how with each additional move, educational attainment is more negatively impacted. Those who are therefore highly mobile, especially those who are regularly moving between temporary accommodations for example, will be most at risk of poor educational outcomes.

This also highlights a policy implication in relation to the bedroom tax, which penalises council or social housing tenants with a spare room. This means that once one child has left home, the amount of housing benefit paid to a claimant is reduced if the property they are renting is judged to have more bedrooms than necessary, which may then encourage them to move while their other child(ren) is still living at home. As the results in chapter 7 have shown, moving LSOA has a negative association with educational attainment at KS4, so the tax in theory is encouraging families to move, even with children still living in the house, which will have potentially negative outcomes on their education.

Although pupils and their families have more choice when it comes to secondary school admission, preference is not always met in large inner-city areas such as London where demand is greater than supply. Those living in inner city areas without the financial means to move have to compete with thousands of others to get a place in their preferred school, often having to settle for a place at a school that was not on their list of choices. Only those with the financial means to move to be nearer good schools can secure a place at their preferred school, those that do not have to settle a place at a schools which is not oversubscribed, often these are lower performing, meaning children remain stuck in a cycle of educational disadvantage.

8.4 Limitations

As with any academic research, this thesis is subject to some limitations, which will be presented and the impact these may have on the conclusions will be discussed. The NPD cohort contained almost half a million pupils, which meant in terms of statistical analysis these results were robust. However, omitted variable bias is a potential problem for this research, as for example parental socio-economic

status and education is known to have an influence on children and young people's educational outcomes, unfortunately this information was unavailable for this research.

Secondly, the NPD only provided LSOA codes as a marker of residential location, although this thesis was more interested in changes in type of neighbourhood, in terms of analysing mobility, all within LSOA moves will not have been accounted for. As LSOAs are only made up of approximately 1500 individuals it is unlikely that there will have been very many within LSOA moves.

Thirdly, the measure of deprivation is only based on a single point in 2010. Deprivation scores for each neighbourhood were therefore constrained over time and do not assume any change. The socio-economic characteristics of neighbourhoods will change over time, which means that the IMD scores and classification of neighbourhoods will differ. Previous research however shows that neighbourhood deprivation remains relatively stable over time (Norman, 2010) so using one measure of the IMD for the entire educational life course is unlikely to cause bias to the outcomes.

Fourth, two of the main criticisms of the IMD is that the UK does not use one uniform measure, therefore comparisons cannot be made between countries (Norman, 2010) and IMD scores collected in 2000, 2004, 2007, 2010 and 2015 are cross sectional so cannot be compared to each other over time due to geographical boundaries changing (Norman, 2015). This thesis only analysed data for NPD pupils living in England. The issue of the IMD not being uniform across the whole of the UK is not an issue here (IMD, 2010). Using one IMD score across the whole of the educational life course also avoids the issue of having to compare different IMD scores from different years.

It is important to recognise that there are several other deprivation measures that could have been used in this thesis, including the income deprivation affecting children index (IDACI) which specifically focuses on children living in low income households under the age of 16, or Townsend index (1979) which takes account of unemployment, material ownership and household overcrowding (Norman, 2015), which for this study would have been useful additional information. In a future study analyses could be run again using different deprivation measures in order to evaluate whether outcomes of mobility would be different, however as this thesis is specifically interested in mobility, only one deprivation index was needed to meet the aims of this research.

Fifth, the neighbourhood change variable measured the difference between origin and final neighbourhood per year, it may have been for example, that a pupil moved from one of the most deprived to the least deprived neighbourhood then back to the most deprived neighbourhood during their final year, however this would not be picked up in the analysis. The previous analyses in chapter 5 has shown however, that less than 1% of the NPD cohort upgrade neighbourhood considerably, so it is unlikely that this will cause considerable bias to results.

Sixth, although FSM is used as a measure of low socio-economic status, it can be a problematic proxy as it only captures one aspect of deprivation and therefore may overlook pupils who are from low income families but are not able to claim FSM (Hobbs and Vignoles, 2009) For this research it would have been preferable to have the NS-SEC social classifications as explanatory variables, as well as FSM for more extensive analysis.

A final limitation of this research is related to selective mobility, in that some pupils could be more likely to move home and school for reasons that are related to both moving and academic performance, which could induce a small amount of bias in the results. Selective migration has been researched in relation to health outcomes (Norman et al, 2005) but there has been very little discussion in terms of educational outcomes.

8.5 Future Work

By linking results to current literature, it has been possible to ascertain why certain social and ethnic groups move. However, without any further markers of socio-economic status and family background it is not possible to have any definitive answers as to the reason for a residential or school move. Linking the NPD data to the Millennium cohort study (MCS) or similar which contain rich data or individual characteristics and family status, would allow for more variables to be factored in when evaluating mobility. It would also better indicate why certain social and ethnic groups have more of a propensity to move than others.

This thesis has been interested in how mobility and type of moves are associated with educational attainment. A future study could focus more on the school environment and evaluate school quality further using additional data from the NPD, as well as school moves in terms of distance and change in ethnic composition. Schools could be assessed on how diverse they are by social-economic and ethnic differences, to better understand the change in school as well as just the move itself.

As well as KS4 results, KS2 results, which are national tests in English, Maths and Science taken at age 11 and KS1 results, which are national tests in English and Maths taken at age 6 are also available to analyse, it would be interesting to standardize these results and compare them, considering the timing of a move to see how moves at certain times throughout the educational life course has influenced test results and to analyse if there are difference among ethnic and social groups.

8.6 Concluding Remarks

When controlling for a range of different individual factors, moving LSOA has a negative association with educational attainment at age 16, with each additional move decreasing KS4 points or odds of achieving five A*-C further. Pupils who move school two or more times also have a negative association with educational attainment, with school moves overall being more detrimental to educational attainment than LSOA moves. The analyses have shown that there are differences among ethnic groups, but the ethnic groups that move more the most do not do the worst at KS4. White British pupils, with the exception of Gypsy and Traveller pupils on the whole achieve the lowest KS4 scores and odds of achieving five A*-C. Eligibility for FSM has a negative association with educational attainment, even those that have only been eligible for one year.

Finally, being 'stuck in *type* of place' has more of a negative association with educational attainment than being 'stuck in place' with those moving between the same type of neighbourhood having lower predicted KS4 point scores and odds of achieving five A*-C than those living in the same neighbourhood throughout the educational life course. Highlighting that in all cases moving has a negative association with educational attainment compared to those who do not move.

There is further work to be done, unpicking the patterns and reasons for residential and school mobility. This thesis however has contributed to the academic literature by demonstrating the importance of considering a longitudinal socio-spatial approach to mobility research. Not only focusing on who is moving, but further unpicking the type of move to better understand differences among social and ethnic groups across time and space.

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Chapter 10: Appendix

10.1 Appendix 1: Supplementary material for chapter 5

Figure 39 shows the Local Authority residuals for average distance moved (Model 1, table 13) by pupils who have never been eligible for FSM across the educational life course. Figure 40 shows the Local Authority residuals for average distance moved (Model 2, table 13) by pupils who have been eligible for FSM across the educational life course. The values above zero indicate a greater than average distance moved for a specific LA and values below zero indicate a lower than average distance moved. The residual plot is discussed in section 5.4 of chapter 5.

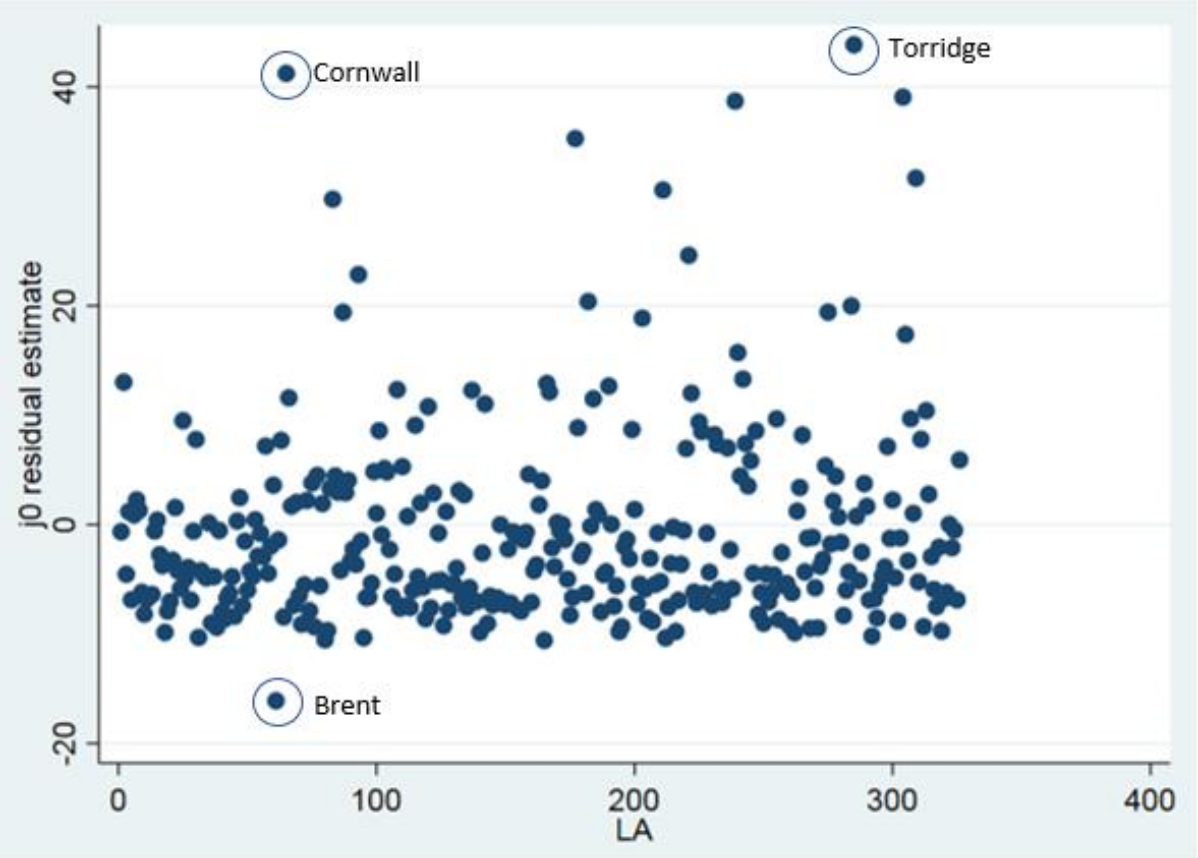

Figure 39: The residual estimates for distance moved for each of the 326 LAs across England (Non FSM pupils)

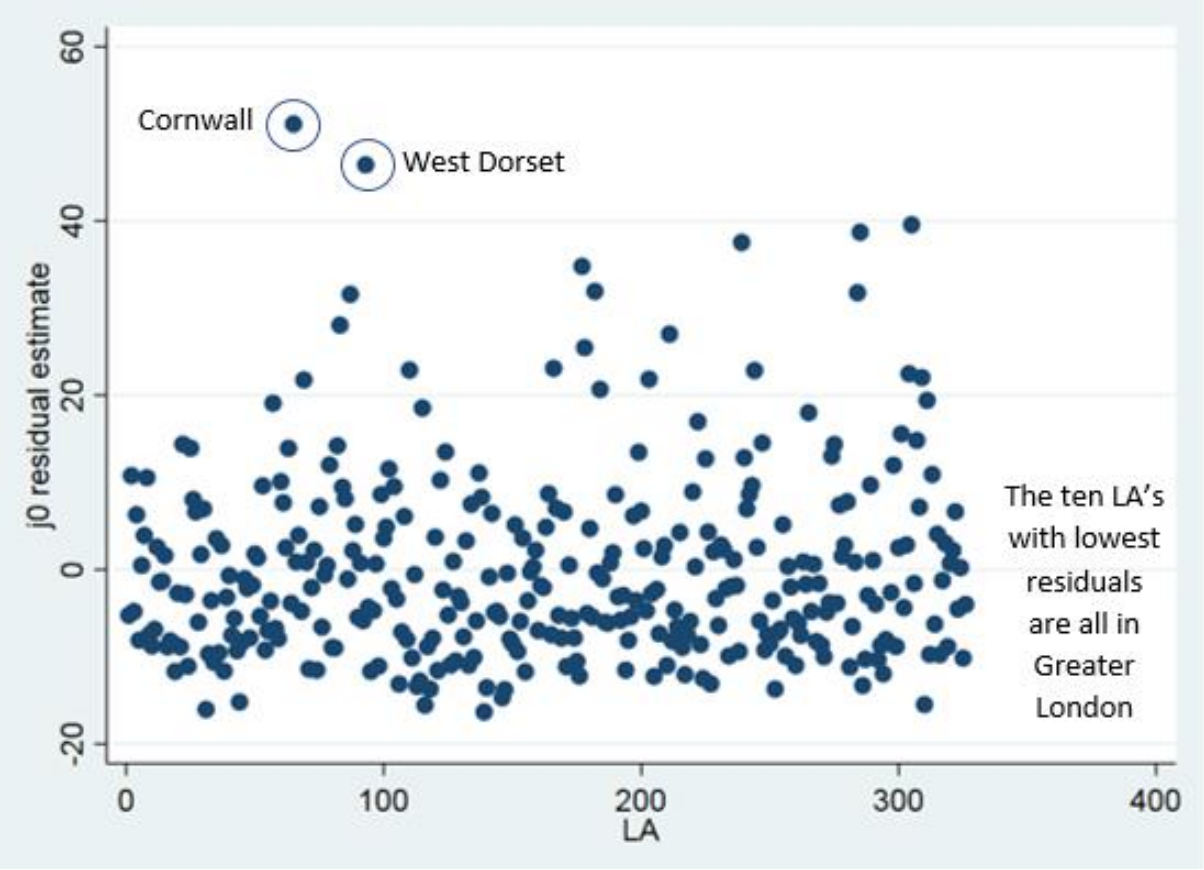

Figure 40: The residual estimates for distance moved for each of the 326 LAs across England (FSM pupils)

10.2 Appendix 2: Supplementary material for chapter 6

Figure 41 shows the Local Authority residuals for the odds of moving school across the educational life course. The values above zero indicate a higher than average number of moves for a specific LA and values below zero indicate a lower number of moves than average. The residual plot is discussed section 6.6 of chapter 6.

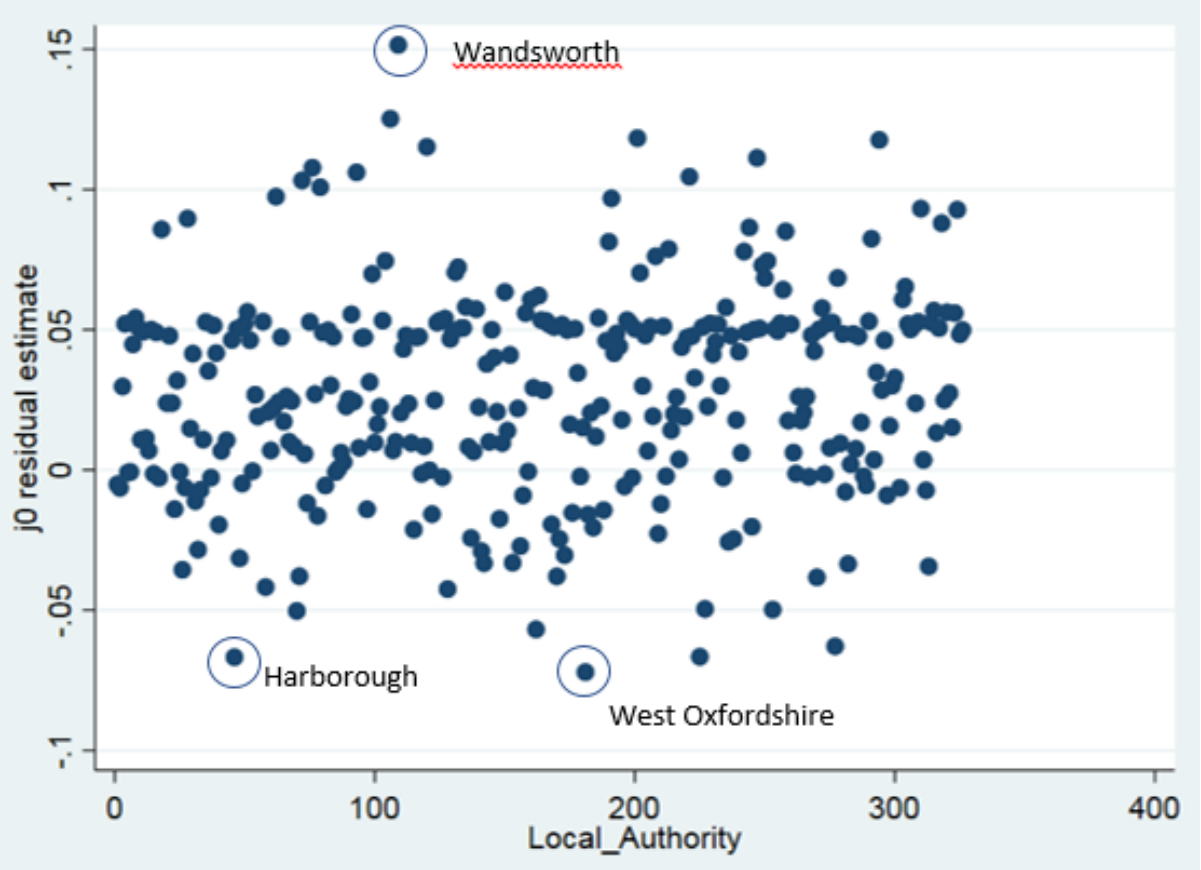

Figure 41: The residual estimates for school moves for each of the 326 LAs across England

10.3 Appendix 3: Supplementary material for chapter 7

Table 41 includes four models showing the odds ratios of achieving 5 A*-C, controlling for LSOA and school moves, gender and ethnicity. Model 8 additionally controls for FSM eligibility, model 9 additionally controls for FSM eligibility and prior attainment and model 10 additionally controls for FSM eligibility, prior attainment and school quality. Table 42 includes two models showing the odds ratios of achieving 5 A*-C, controlling for neighbourhood type, gender, ethnicity and distance moved. Model 16 additionally controls for FSM eligibility.

Odds of achieving five A*-C	Odds Ratio /CR S.E	Odds Ratio/ CR S.E	Odds Ratio/ CR S.E	Odds Ratio/ CR S.E
LSOA moves Reference: 0 moves				
1	0.85** (0.01)	0.92** (0.01)	0.93** (0.01)	0.91** (0.01)
2	0.68** (0.01)	0.81** (0.01)	0.82** (0.01)	0.82** (0.01)
3	0.58** (0.01)	0.73** (0.01)	0.74** (0.01)	0.76** (0.01)
4	0.50** (0.01)	0.65** (0.01)	0.67** (0.01)	0.65** (0.02)
5+	0.44** (0.01)	0.61** (0.02)	0.63** (0.02)	0.64** (0.02)
School Moves Reference: 0 moves				
1	1.02** (0.01)	1.07** (0.01)	1.05** (0.01)	1.01 (0.01)
2	0.61** (0.01)	0.72** (0.01)	0.73** (0.01)	0.78** (0.01)
3	0.35** (0.01)	0.46** (0.01)	0.48** (0.02)	0.54** (0.02)
4	0.22** (0.02)	0.31** (0.04)	0.34** (0.04)	0.36** (0.05)
5+	0.24** (0.07)	0.31** (0.10)	0.36** (0.12)	0.30** (0.14)
LSOA & School Moves Reference: 0 moves				
1	0.74** (0.01)	0.86** (0.01)	0.86** (0.01)	0.91** (0.01)
2	0.45** (0.01)	0.64** (0.01)	0.67** (0.01)	0.75** (0.01)
3	0.32** (0.01)	0.53** (0.01)	0.56** (0.01)	0.66** (0.02)
4	0.22** (0.01)	0.40** (0.02)	0.42** (0.02)	0.56** (0.03)
5+	0.12** (0.01)	0.25** (0.02)	0.26** (0.02)	0.31** (0.02)
Gender Reference: Girls				
Boys	0.62** (0.01)	0.59** (0.01)	0.58** (0.01)	0.54** (0.01)
Ethnic Group Reference**:** White British				
Bangladeshi	1.33** (0.04)	2.40** (0.08)	2.21** (0.07)	3.02** (0.11)
Black African	0.82** (0.01)	1.14** (0.02)	1.24** (0.02)	1.77** (0.04)
Black Caribbean	1.14** (0.02)	1.71** (0.03)	1.49** (0.03)	2.06** (0.04)
Chinese	4.92** (0.35)	4.91** (0.37)	4.38** (0.33)	3.86** (0.34)
Indian	2.22** (0.05)	2.26** (0.05)	2.01** (0.05)	2.37** (0.06)
Mixed	1.18** (0.02)	1.50** (0.02)	1.38** (0.02)	1.35** (0.03)
Other	1.25** (0.03)	1.75** (0.04)	1.49** (0.03)	1.79** (0.05)
Pakistani	2.67** (0.10)	3.21** (0.13)	2.65**(0.13)	2.92** (0.14)
White Other	1.62** (0.03)	1.94** (0.04)	1.60** (0.03)	1.77** (0.05)

Traveller Gypsy	0.18** (0.02)	0.30** (0.04)	0.39** (0.04)	0.45** (0.06)
FSM eligibility: Reference: No FSM				
1 year		0.42** (0.01)	0.50** (0.01)	0.58** (0.01)
2-4 years		0.35** (0.01)	0.43** (0.01)	0.52** (0.01)
5-7 years		0.28** (0.01)	0.36** (0.01)	0.46** (0.01)
8-10 years		0.21** (0.01)	0.28** (0.01)	0.39** (0.01)
11 years		0.19** (0.01)	0.27** (0.01)	0.40** (0.01)
School Quality: Reference: 5				
4			0.57** (0.01)	0.68** (0.01)
3			0.43** (0.01)	0.54** (0.01)
2			0.33** (0.01)	0.42** (0.01)
1			0.20** (0.01)	0.26** (0.01)
KS2				1.24** (0.01)
cons	1.84** (0.01)	2.34** (0.02)	5.18** (0.05)	

Table 42: Logit Regression output showing the odds rations of achieving 5 A*-C, controlling for LSOA moves, school moves, gender, ethnicity, FSM eligibility, school quality and prior attainment using cluster robust standard errors.

Neighbourhood Type Reference: Low>Low (stay)	Model 15 Odds Ratio	Cluster Robust Std. Err.	Model 16 Odds Ratio	Cluster Robust Std. Err.
High > high (move)	0.17**	0.01	0.30**	0.01
High > high (stay)	0.24**	0.01	0.35**	0.01
High > low	0.34**	0.01	0.44**	0.01
High>Mid(move)	0.25**	0.01	0.37**	0.01
Low > high	0.30**	0.01	0.40**	0.01
Low > low (move)	0.82**	0.01	0.86**	0.01
Low>Mid (move)	0.54**	0.01	0.61**	0.01
Mid > Mid (move)	0.37**	0.01	0.46**	0.01
Mid >Mid (stay)	0.53**	0.01	0.58**	0.01
Mid>High (move)	0.22**	0.01	0.34**	0.01
Mid>Low (move)	0.55**	0.01	0.62**	0.01
Gender Reference: Girl				
Boy	0.60**	0.01	0.58**	0.01
Ethnic Group Reference: White British				
Bangladeshi	2.42**	0.08	3.23**	0.11
Black African	1.38**	0.03	1.54**	0.03
Black Caribbean	2.19**	0.03	2.19**	0.04
Chinese	5.47**	0.40	5.36**	0.41
Indian	2.99**	0.07	2.79**	0.07
Mixed	1.42**	0.02	1.65**	0.03
Other	1.63**	0.04	1.99**	0.05
Pakistani	3.38**	0.13	3.69**	0.15

White Other	1.88**	0.38	2.10**	0.05
Traveller Gypsy	0.18**	0.02	0.27**	0.04
Distance Moved Reference: No distance (no move)				
Short distance only (<30 miles)	1.02**	0.01	1.01**	0.01
Long distance only (>30 miles)	1.20**	0.04	1.15**	0.04
Short and Long distance	0.81**	0.02	0.92**	0.02
FSM eligibility Reference: 0 years				
1 year			0.48**	0.01
2-4 years			0.42**	0.01
5-7 years			0.34**	0.01
8-10 years			0.27**	0.01
11 years			0.27**	0.01
_cons	3.49**	0.04	3.77**	0.04
R2	0.07		0.10	

Table 43: Logit Regression output showing the odds rations of achieving 5 A*-C, controlling for neighbourhood type, gender, ethnicity, distance moved and FSM eligibility using cluster robust standard errors.